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W. B. WILSON, Secretary

CHILDREN'S BUREAU

JULIA C. LATHROP, Chief

INFANT MORTALITY

RESULTS OF A FIELD STUDY IN AKRON, OHIO,
BASED ON BIRTHS IN ONE YEAR

By

THERESA S. HALEY

INFANT MORTALITY SERIES No. 11

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF LABOR,
CHILDREN'S BUREAU,
Washington, November 1, 1919.

SIR: Herewith I transmit a study of infant mortality made by the Children's Bureau in the city of Akron, Ohio.

Miss Theresa S. Haley was director of the field work and has written the report. Special acknowledgment is made of the services of the special agents, Mr. Frank Drown and the Misses Alice Gannett, Alice Hill, Elizabeth Moore, Etta Philbrook, Marion Shaffner, Jessamine S. Whitney, Margaretta Williamson, and Mr. Harry Richards. Dr. Robert M. Woodbury wrote the appendix on method of procedure.

The Children's Bureau acknowledges, with appreciation, the cordial cooperation of municipal authorities, of volunteer associations, and of the press of Akron.

JULIA C. LATHROP, *Chief.*

Hon. W. B. WILSON,
Secretary of Labor.



INFANT MORTALITY—AKRON, OHIO.

INTRODUCTION.

Akron, Ohio, was chosen as the seventh city in the series of studies made by the Children's Bureau into the social and economic conditions underlying infant mortality. The population of Akron had increased very rapidly within the past few years, chiefly by the addition of persons of foreign birth, and 19 per cent of the population in 1910 were foreign born. Industrial conditions in Akron were different from those in the other cities studied; the rubber industry predominated; wages were relatively high. Located in the central part of Ohio, it afforded an opportunity to study the effect upon infant mortality of conditions in an industrial city of the Middle West. It seemed desirable to make a study of such a city; and Akron, though not in the birth-registration area, appeared to have fairly complete records of births and deaths. The procedure adopted, discussed fully in the appendix, included a house-to-house canvass to supplement the birth and death records.

DESCRIPTION OF CITY.

Akron lies 36 miles south of Cleveland, and in 1915 had a population of just over 100,000.¹ It covers 11½ square miles of rolling country on the banks of the Little Cuyahoga River and the Ohio Canal, and spreads out over the seven surrounding hills.

Excellent transportation facilities have contributed largely to the rapid growth of the city. The canals were responsible for the early development of Akron; the Ohio Canal, begun in 1825, connected the city with Lake Erie at Cleveland and with the Ohio River at Portsmouth; the Pennsylvania & Ohio Canal placed Akron in direct line of communication between Pittsburgh and Cleveland. But both these means of transportation have fallen completely into disuse. At present the city is served by three trunk-line railroad systems.

The principal industries of the city at the time of the study were the manufacture of automobile tires and of sewer pipes. It is the largest rubber manufacturing center in the world. In the earlier days cereal and grist mills represented the chief industry, but these have now a lesser relative importance. Manufactures have always

¹ According to an enumeration of population made in connection with the house-to-house canvass for births, there was a population of 100,079 on Apr. 10, 1915. This was somewhat greater than the estimated population of 82,958 for July 1, 1915, based upon the average annual increase of the population of the city from 1900 to 1910.

constituted the city's claim to distinction; and it has been known at different periods as the Oatmeal Town, the Match Town, the Sewer-Pipe Town, and the Rubber City, having stood first in the country in the manufacture of each of these products successively. Next in importance to the rubber-goods industry is the sewer-pipe industry, and the stacks of sewer pipes that stretch for miles in the eastern and southern portions of the city and along the railroads bear witness to the volume of the product. Foundries and machine shops have always held an important place among the city's industries; in the early days they produced agricultural implements and mining machinery, but now they produce largely materials for the rubber factories.

Except for its large modern factories the city has few of the external characteristics of an important industrial city; instead of sky scrapers and rows of tenement houses it has modest though up-to-date office buildings and low detached cottages with lawns, gardens, and shade trees.

POPULATION—SIZE AND COMPOSITION.

Akron was incorporated as a city in 1836, and its growth has been continuous and rapid. Since 1870 each decennial increase has exceeded 50 per cent. The population was mainly of native stock until after 1860. Beginning about that date, however, large numbers of emigrants from northern Europe found work in Akron and settled there. In 1890 one-fifth of the population was foreign born, chiefly German and British. In 1910, 19 per cent of the population was foreign born, but of somewhat different racial stocks, coming principally from Austria-Hungary, Germany, Great Britain and Ireland, Italy, and Russia. Besides these one-fourth of the population was of foreign or mixed parentage. From 1900 to 1910 the increase in the city's foreign population was 86 per cent in contrast to an increase in the native population of only 57 per cent.

The rapid increase in the foreign population of the city and its changing character presented new problems of assimilation; the growth of the city brought into the foreground the problems of sanitation, water and milk supply, and hospital equipment, which each city has to face and solve for itself.

METHOD OF PROCEDURE.

In Akron the infant mortality study was confined to babies born in the city during a 12-month period—the year ended June 30, 1914. Since Akron was not in the birth-registration area it was necessary to check the completeness of the city's birth registration and to supplement records of births by means of a house-to-house canvass. The list of births thus secured, a total of 3,021, was used as the basis for investigation.

The primary purpose of the study was to reveal the economic, social, and civic conditions with which in some measure the city's infant deaths might have been connected. Accordingly, the mother of every baby born in Akron between July 1, 1913, and June 30, 1914, was visited; and if the child had spent the entire first year of his life in Akron, a schedule of his health and care was obtained, giving also information on the economic and social conditions of the family and the sanitary condition of the home for the first year of the child's life.

Not all births discovered from the records and from the canvass could be used in the study. In a number of instances mothers had left the city and the neighborhood and could not, therefore, be conveniently interviewed. A few cases were found where the mothers were nonresident; in still other cases no trace could be found of the mother or of the baby. Illegitimate births, a few of which were found, were excluded from the study. A detailed description of the procedure followed in excluding births, together with a discussion of infant mortality rates for the excluded cases, will be found in the appendix (p. 78); a complete discussion of the methods and results of the canvass is also presented.

COOPERATION.

From the beginning of the bureau's preliminary work in Akron the press kept in close touch with the work and generously gave space for articles on its purpose, scope, and progress. Various social and other organizations showed their interest by asking for speakers to address them on the subject of the study. So well was the study indorsed and advertised that without a single exception the mothers gave the intelligent cooperation on which the success of any such study is dependent.

ANALYSIS OF FINDINGS.

INFANT MORTALITY RATE.

The births in the city during the selected year included in this detailed study numbered 2,322. Sixty-nine of these were stillbirths, 3 per cent of the total. Of the 2,253 live-born infants 193 died during the first year of life, giving an infant mortality rate of 85.7 per 1,000 live births.

Akron had a lower rate of infant mortality than that of any other of the seven cities studied by the Children's Bureau, with the exception of Saginaw, Mich., where the rate was 84.6. The following table presents the relative standing of the seven cities studied:

City.	Infant mortality rate.	City.	Infant mortality rate.
Manchester, N. H.....	165.0	Brockton, Mass.....	96.7
Johnstown, Pa.....	134.0	Akron, Ohio.....	85.7
New Bedford, Mass.....	130.3	Saginaw, Mich.....	84.6
Waterbury, Conn.....	122.7		

An infant mortality rate for the entire United States can not be shown, since many States are not recognized by the United States Bureau of the Census as having sufficiently trustworthy birth and death records upon which to base statistics. In 1916 for the census "area of birth registration," including 11 States and the District of Columbia, the infant mortality rate was 101;² for the cities within these States, the rate, 104, was slightly higher than for the entire birth-registration area. Both these rates were considerably higher than the mortality rate in Akron.

Many cities, however, have reduced their infant mortality considerably below the average for the birth-registration area and also below the infant mortality rate which Akron has attained. Among the cities of over 10,000 population in the birth-registration area, 65 had in 1916 infant mortality rates of less than 85 and 7 of less than 50.

INFANT MORTALITY, BY DISTRICTS.

In Table I is shown the variation of infant mortality in different sections of the city. The wards into which the city was divided politically had no significance from a sociological point of view, since most of them extended from the center of the city to the outskirts and embraced the utmost diversity of conditions. For the purposes of this study, therefore, the city was divided into nine compact areas

² See Appendix, p. 77, for comparability of rates.

having as much sociological and topographical homogeneity as possible (see map, p. 11). The infant mortality rates were the lowest in the districts known as east exchange (53.8) and southwest (58.3), and highest in the business (103.7) and the valley (112.9) districts.

TABLE I.—*Births during selected year, infant deaths, infant mortality rates, and per cent of stillbirths, according to district of residence.*

District of residence.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent. ^a
The city	2,322	2,263	193	85.7	69	3.0
East exchange.....	321	316	17	53.8	5	1.6
Southwest.....	249	240	14	58.3	9	3.6
West.....	378	370	30	81.1	8	2.1
North Hill.....	76	73	6	.....	3	.....
West Hill.....	203	198	18	90.9	5	2.5
South central.....	338	327	30	91.7	11	3.3
East Hill.....	118	111	11	99.1	7	5.9
Business.....	308	299	31	103.7	9	2.9
Valley.....	331	319	36	112.9	12	3.6

^a Not shown where base is less than 100.

A brief description follows of the districts having the highest and lowest infant mortality rates in the city.

VALLEY AND BUSINESS DISTRICTS.

The valley and business districts had the highest infant mortality rates. The greater part of these districts lies in the lowest section of the city; through these districts runs the Little Cuyahoga River and around them three lines of railroads. The Ohio Canal also passes through this section. Large numbers of foreigners—chiefly Italians and Slavs, with a few Syrians and Greeks—lived in these districts.

In the valley district were several large factories, including some of the largest rubber and sewer-pipe establishments. Housing conditions were relatively poor. Many of the houses were in bad repair. Nearly all the streets were unpaved and fewer streets had sewers than in other districts. In some instances sewer connections were outside and in these cases sewer privies instead of water-closets were common. In connection with the low-lying character of this section it should be noted that the river was polluted with industrial wastes, sewage, and garbage. During the period covered by the study there was an open sewer on one street from which sewage spread out over the low ground toward the river. In another section near the river a drainpipe emptied into a depression in the ground, making a stagnant pool. This section had two large dumps upon which garbage was commonly deposited until 1915, and even in 1915 enough garbage was placed there to be noticeable and to breed

swarms of flies. It was common for families to throw garbage into the river and onto its banks.

The business district comprised all the most congested areas in the city. More than one-third the families included in the study that lived in tenement houses with three or more families were located in the business district. Many of the notoriously bad housing "spots" were within this area, as well as the central mercantile districts, railroad yards, and a number of large factories. Though it was in the heart of the city this district contained streets without sewers, and even on the sewered streets were found many outdoor vault privies. The district had one large dump on which was placed miscellaneous rubbish, including more or less garbage, which was very offensive.

EAST EXCHANGE AND SOUTHWEST DISTRICT.

In contrast to these were the conditions in the east exchange and southwest districts where the mortality among infants was lowest. These sections comprised in the main comparatively high land; practically all the streets had sewer and water mains and the principal streets were well paved. With the exception of the gully of Wolf Ledge Run there were no dumps or other garbage nuisances, no factories, and only a few tenement houses. The houses in general were simple two-story frame buildings with well-kept yards and air space on four sides. These were not the wealthiest sections of the city but were inhabited largely by families of prosperous wage earners. Of the births which occurred in these two districts 72 per cent were to native mothers as contrasted with only 45 per cent for the valley and business districts.

NATIVITY AND NATIONALITY OF MOTHER.

In Akron, as in most of the other cities studied by the Children's Bureau, the infants of native mothers had a considerably lower mortality than those of foreign-born mothers. Table II shows a mortality rate of 70.1 for infants of native mothers and 109.3 for infants of foreign-born mothers. Of the foreign groups the rate was highest, 146.6, among the Slavs. The mortality of infants of Italian mothers was 116.4; of German mothers, 105.0; and of Magyar, 102.8. So few infants of the other nationalities were included in the study that no mortality rates are shown for these groups; since the study included only 11 infants of colored mothers, no comparison can be made of mortality among infants of white and colored mothers.

TABLE II.—*Births during selected year, infant deaths, infant mortality rates, and per cent of stillbirths, according to nationality of mother.*

Nationality of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	2,322	2,253	193	85.7	69	3.0
Native mothers.....	1,402	1,356	95	70.1	46	3.3
Foreign-born mothers.....	920	897	98	109.3	23	2.5
German.....	226	219	23	105.0	7	3.1
Italian.....	152	146	17	116.4	6	3.9
Slavic.....	192	191	28	146.6	1	.5
Magyar.....	109	107	11	102.8	2	1.8
English, Irish, Scotch, and Welsh ^b	76	73	6	.....	3	.....
Jewish.....	61	59	3	.....	2	.....
All other c.....	104	102	10	98.0	2	1.9

^a Not shown where base is less than 100.^b Including 46 English, 19 Irish, 9 Scotch, and 2 Welsh.^c Including 28 Syrian, 21 Scandinavian, 18 Roumanian, 11 Lithuanian, 11 Canadian (except French Canadian), 9 French, 1 French Canadian, 1 Greek, 1 Armenian, 1 Dutch, and 2 foreign colored.

In connection with the differences in the mortality rates of infants of foreign-born mothers it will be of interest to summarize briefly the general characteristics of the nationalities. The Germans, Slavs, Italians, and Magyars were numerically the most important foreign nationalities in the group selected for this study. In the following sections the groups are discussed in the order of the infant mortality rates shown for the selected year.

SLAVS.

In the Slavic population of Akron the largest groups were the Serbo-Croatian and Slovak, but other Slavic nationalities were represented. Among the mothers included in the study seven Slavic races were represented.

Of all the foreign groups the Slavs had the highest infant mortality rate. The mothers nursed their babies to a large extent through the first year of life, but frequently began, even in the early months, to give them solid food in the belief that such food would make them strong. The women were sturdy, able to do all the work in house and garden without help, and often followed their old-country custom of carrying on much of their housework outdoors and in bare feet. The mother frequently took boarders under a so-called "company plan." Under this plan each boarder paid \$3 or \$4 a month for sleeping quarters, besides his share of the food bills; the mother paid for her share and that of her small children by her services as cook. In spite of crowded conditions and lack of household aids, the homes were generally clean and comfortable.

Over one-fourth of the births to Slavic mothers were to mothers who were unable to read and write, and over three-fourths were to mothers who were unable to speak English.

The Slavs of Akron had come chiefly from the villages and small towns of Austria-Hungary and were of strong physique and suited to the unskilled heavy work which, as a rule, they were doing in the large factories. They showed a strong tendency to live in compact settlements near their places of work; they showed also a strong desire to own their own homes. As soon as possible the family began to buy a house or to acquire land and build one. In the latter case the house was frequently small and without modern conveniences but usually surrounded by as large a garden for both flowers and vegetables as the lot allowed. The Slavic families which had been in Akron a long time and had prospered were proud of the fact that they no longer took lodgers, and the size and attractiveness of their houses showed that the insanitary and crowded conditions of the homes of some of the newer comers must have been the result of poverty rather than of choice.

ITALIANS.

Approximately one-sixth of the births to foreign-born mothers were to mothers of Italian nationality. On the average these mothers had been in this country slightly longer than the Slavs, but were able to use English to an even less degree. Mothers of 83 per cent of these infants could speak no English. This was due not only to a clannish tendency among the Italians, but also to the custom of keeping the women in the homes. A high percentage of illiteracy also was found among the Italians, mothers of 49 per cent of the infants being unable to read and write.

The Italian parents were devoted to their children, ready to the best of their knowledge to do everything for their welfare. Though the homes were often dirty the babies seldom looked neglected. The proportion of infants breast fed was higher in the Italian group than in any of the other foreign nationalities. Promiscuous feeding in the early months was much more rare than among other nationality groups. The custom of wrapping babies under 6 months in stiff swaddling clothes, encasing both body and legs, was common. Older children, especially if they had begun to walk, were often scantily clothed. None of the Italian mothers in the group studied had left her baby to go to work even though, during part of the period under study, general unemployment caused much distress among these families. Two-thirds of the Italian mothers who were visited had kept lodgers at some time during the baby's first year, though in many instances the persons recorded as lodgers were relatives or former fellow townsmen taken in for accommodation rather than for income. Few of these mothers kept more than five or six lodgers.

Approximately one-half the Italian wage earners were unskilled laborers doing heavy construction work, repairing and cleaning

streets, and performing other similar work. The average rate of pay for such unskilled labor was about \$2 a day, and when the seasonal character of the work is taken into consideration it becomes evident that the actual earnings were very low. Yet one-half of the Italian families included in the study owned or were buying their homes, and a number owned other property besides.

Until the flood, March, 1913, nearly all the Italians lived in the upper end of the business district. The flood destroyed many of their homes, and they had to scatter, spreading out around the foot of North and West Hills and along the railroad tracks in the south central district.

GERMANS.

Mothers in the German group nursed their babies to a large extent and rarely left them or the home to go to work. Ninety-one per cent of these mothers were able to read and write, but only about one-half of the German mothers visited could speak English, though over three-fourths of them had been in this country more than three years. Only a small proportion of these families took boarders or lodgers during the period under study.

Previous to 1900 most of the German-speaking immigrants had come from Germany or Switzerland. In general they were skilled workmen who prospered and at the time of the study had become practically assimilated. The more recent Germanic immigration was for the most part from Hungary. These immigrants were of peasant stock, strong, sturdy, able, and willing to do the heavy unskilled work required by the city's industries. Their thrift and love for home life were shown in the large percentage of home owners—about 50 per cent. Nearly one-half of the Germanic families included in the study lived in the south central district close to the largest rubber factory in the city.

MAGYARS.

The Magyar mothers clung to old-country customs in the care of households and children. They nursed their babies to a less extent than the Slavic mothers, but like them seldom left the babies or homes in order to go to work. The mothers did the work of the house and garden, frequently even up to the time of confinement. More than two-thirds of the Magyar mothers visited were unable to speak English though 61 per cent had been in America more than three years. Eighty-seven per cent were able to read and write. The Magyars as found in Akron were strong, sturdy men and women; the fathers were employed usually in occupations requiring strength and endurance rather than skill. Practically all of them were peasants from the villages and small towns, who had been accustomed in the old country to live in one- or two-room cottages with primitive arrange-

ments and so found it no hardship to live in one or two rooms, a tiny cottage, often only a shack or a portion of a larger house. The most recent comers often were found keeping house in one or two rooms in a tenement. As soon as possible, however, they would buy or build a shack and have independent living quarters; and later a larger and better type of dwelling would be acquired, a portion perhaps being sublet to help pay for it. With the exception of a few families who lived in bad tenements, the Magyar families lived chiefly in small detached houses. High rents in the better sections of the city combined with a strong prejudice against foreigners as tenants tended to keep the recently arrived Magyar families congested in one of the poorest sections of the city. As these families improved their conditions financially they moved into the better portion of the south central district and gradually into the west and southwest districts of the city. They seemed to prefer to have small quarters and independent living conditions rather than to share their homes with other families or to take boarders. Nine-tenths of the families visited were living in separate households, and only one-fourth had boarders during the period covered by the study. When boarders were kept it was almost invariably upon the "company plan" as among the Slavs.

CAUSE OF DEATH.

The causes of death, as given by the physicians on the death certificates, were classified according to the International List of Causes of Death, and then grouped into eight principal groups. The most important single group was that of causes peculiar to early infancy, which included 65 of the 193 deaths. The other two main groups of causes to which infant deaths were attributed were gastric and intestinal diseases and respiratory diseases. In Table III the distribution of the infant deaths in Akron is shown by cause of death.

TABLE III.—*Number and per cent distribution of deaths among infants born during selected year, according to cause of death.*

Cause of death.*	Infant deaths.	
	Number.	Per cent distribution.
All causes.....	193	100.0
Gastric and intestinal diseases.....	46	23.8
Respiratory diseases.....	23	11.9
Malformations.....	9	4.7
Early infancy.....	65	33.7
Premature birth.....	39	20.2
Congenital debility.....	20	10.4
Injuries at birth.....	6	3.1
Epidemic diseases.....	13	6.7
External causes.....	1	.5
Diseases ill defined or unknown.....	10	5.2
All other causes.....	26	13.5

* See General Table 7 for detailed cause of death.

In Table IV a comparison is presented of the specific infant mortality rates from each cause for the different cities studied by the bureau.

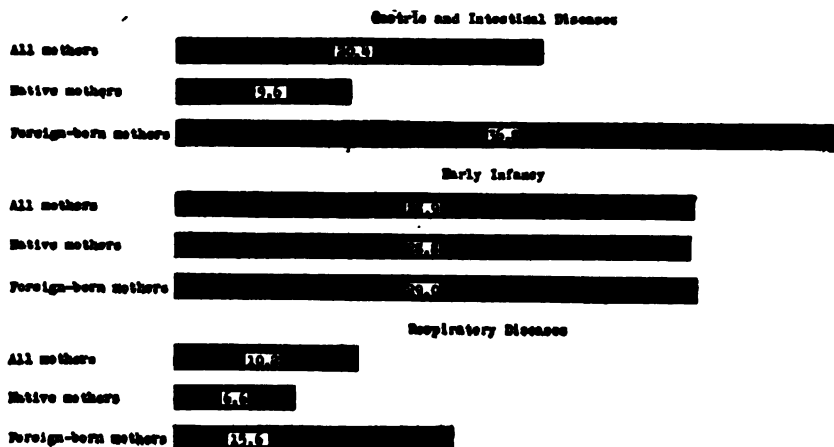
TABLE IV.—*Infant mortality rates for specified cities, by cause of death.*

Cause of death.	Akron.	Johns- town.	Man- chester.	Saginaw.	Brock- ton.	New Bedford.	Water- bury.
All causes	85.7	134.0	165.0	84.6	96.7	130.3	122.7
Gastric and intestinal diseases	20.4	22.8	63.3	8.2	12.4	48.3	41.0
Respiratory diseases	10.2	26.7	26.2	10.2	13.2	27.8	18.2
Malformations	4.0	3.4	9.0	4.1	5.0	4.6	4.7
Early infancy	28.9	39.6	39.6	37.7	37.2	29.0	38.7
Premature birth	17.3	14.4	14.7	12.2	16.5	9.7	15.9
Congenital debility	8.9	20.5	24.3	24.5	14.9	15.5	16.8
Injuries at birth	2.7	4.8	.6	1.0	5.8	3.9	6.1
Epidemic diseases	5.8	11.6	3.2	5.1	8.3	8.9	8.4
External causes	.4						.5
Diseases ill defined or unknown	4.4	7.5	7.0	4.1	5.0	2.7	1.9
All other causes	11.5	12.3	16.6	15.3	15.7	8.9	9.3

CAUSES PECULIAR TO EARLY INFANCY.

The largest number of deaths in Akron occurred from the group of causes peculiar to early infancy. Compared to the other cities studied by the bureau, Akron had the lowest mortality rate from this group of causes, though the mortality from these causes does not vary much from city to city. The infants of native and foreign-born mothers had practically the same rates of mortality from this group of causes.

Chart I.—Infant mortality rates from specified diseases among infants of all mothers, and of native and foreign-born mothers separately.



Obviously, most of the deaths from premature births, congenital debility, and injuries at birth—the causes grouped under diseases of early infancy—occur in the first two weeks or in the first month of

life. Practically all the deaths that occur in the first two weeks of life are to be attributed to one or the other of these causes, which in general are due to prenatal or natal conditions. The stillbirths also are caused by the same general conditions as are responsible for most of the deaths under two weeks. Nearly all these deaths and stillbirths are due to conditions affecting the mother before birth or to complications at confinement, most of which are preventable by skilled obstetrical care. Of the 262 stillbirths and deaths, 69 were stillbirths and 73 deaths occurred in the first two weeks of life, a total of 142, or 54 per cent of all the losses. A somewhat more accurate way of measuring the importance of prenatal and natal conditions upon infant mortality and death prior to birth is to add to the stillbirths the deaths ascribed to diseases of early infancy. This procedure gives a total of 134, or 69 per cent of the total losses to be ascribed to natal and prenatal conditions.

TABLE V.—Deaths among infants born during selected year to mothers of specified nativity, and specific infant mortality rates, by cause of death.

Cause of death.	Deaths among infants born during selected year to—					
	All mothers.		Native mothers.		Foreign-born mothers.	
	Number.	Infant mortality rate.	Number.	Infant mortality rate.	Number.	Infant mortality rate.
All causes.....	193	85.7	95	70.1	98	109.3
Gastric and intestinal diseases.....	46	20.4	13	9.6	33	36.8
Respiratory diseases.....	23	10.2	9	6.6	14	15.6
Malformations.....	9	4.0	6	4.4	3	3.3
Early infancy.....	65	28.9	39	28.8	26	29.0
Premature birth.....	39	17.3	27	19.9	12	13.4
Congenital debility.....	20	8.9	9	6.6	11	12.3
Injuries at birth.....	6	2.7	3	2.2	3	3.3
Epidemic diseases.....	13	5.8	8	5.9	5	5.6
External causes.....	1	0.4	.....	.....	1	1.1
Diseases ill defined or unknown.....	10	4.4	3	2.2	7	7.8
All other causes.....	26	11.5	17	12.5	9	10.0

The most effective method by which a community can reduce the loss ratio from these causes is by providing care and instruction for the pregnant mother and skilled attendance during her confinement. Akron had at this time no public or private organization whose duty it was to give prenatal care and advice; it had little hospital provision for the care of maternity cases, and no physician specializing in obstetrics. No attempt was being made to reduce the largest factor in its infant mortality rate by safeguarding infant life before and at birth.

GASTRIC AND INTESTINAL DISEASES.

After diseases incident to early infancy, gastric and intestinal diseases were most fatal to babies included in the study. The mortality

from gastric and intestinal diseases was higher than for either Saginaw or Brockton, where the proportion of infants of foreign-born mothers was relatively low, but lower than in Johnstown, Manchester, New Bedford, and Waterbury, in which there was an unusually large proportion of infants of foreign-born mothers. In Akron a striking difference appeared in the mortality from gastric and intestinal diseases of infants of native and of foreign-born mothers. The specific mortality rate from these causes for infants of native mothers was 9.6 as contrasted with 36.8 for foreign-born mothers; the latter nearly four times as high as the former. Among the Slavic group in particular the mortality was exceptionally high, half the deaths being due to these causes. This rate for infants of native-born mothers is fairly comparable to the rates from these causes in Saginaw and Brockton. The rate for infants of foreign-born mothers, on the other hand, is considerably lower than similar rates for infants of foreign-born mothers in Johnstown, Manchester, and New Bedford, which were, respectively, 54, 67.2, and 54.9.

The districts showing the highest mortality rate from these causes were the south central and business districts, two of the more congested sections of the city.³ In this connection it is of interest that in the valley district where bad housing conditions were found and where a large number of Italian families lived, the mortality from gastric and intestinal diseases was relatively low. The Italian mothers gave their babies exclusive breast feeding to a much greater extent than the mothers of any other nationality.

Climatic conditions play an important part in increasing the number of deaths from gastric and intestinal diseases. Most of the deaths from gastric and intestinal diseases occurred during the months of July, August, and September. A comparison of conditions of temperature and precipitation during the summer months of 1913 and 1914 with those of the preceding two years and the following year shows that during the years under study the meteorological conditions were normal and may be taken as fairly typical of Akron.

Temperature and precipitation for Akron, Ohio, 1911-1915.

[Furnished by the Weather Bureau, United States Department of Agriculture.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	12-month period.
MEAN TEMPERATURE.													
1911.....	30	31	34	46	66	70	74	72	66	52	36	34	51
1912.....	16	21	30	50	62	66	72	68	66	54	42	32	48
1913.....	34	23	37	49	59	69	72	72	64	54	43	34	51
1914.....	30	19	33	47	62	70	72	71	63	57	40	26	49
1915.....	25	33	31	55	57	65	70	(a)	67	54	42	29	(a)

³ General Table 8.

Temperature and precipitation for Akron, Ohio, 1911-1915—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	12-month period.
MAXIMUM TEMPERATURE.													
1911.....	54	58	60	74	93	95	99	96	86	74	68	60	99
1912.....	44	55	66	76	88	88	89	88	92	81	69	59	92
1913.....	57	60	73	83	85	96	95	95	93	82	69	53	96
1914.....	63	52	67	86	92	95	97	94	90	79	73	60	97
1915.....	50	59	52	89	85	87	90	87	89	77	72	58	90
MINIMUM TEMPERATURE.													
1911.....	1	13	5	19	32	51	50	48	43	29	12	11	1
1912.....	-12	-12	8	26	34	36	51	47	37	31	21	10	-12
1913.....	13	0	3	25	30	37	47	47	35	27	19	13	0
1914.....	-1	-6	6	20	32	41	52	41	36	29	14	-5	-6
1915.....	-3	6	13	24	32	42	50	39	36	29	23	10	-3
PRECIPITATION (INCHES).													
1911.....	1.69	1.79	1.31	3.24	2.18	4.99	3.07	4.88	5.42	6.40	2.82	3.50	41.29
1912.....	2.11	1.67	3.52	5.60	2.62	3.07	5.55	2.71	4.27	2.18	1.48	1.97	36.75
1913.....	5.86	2.01	10.89	2.72	2.61	1.79	5.64	1.96	3.10	3.99	2.96	1.88	45.43
1914.....	2.53	2.59	2.57	4.93	4.19	3.19	1.42	5.77	2.20	3.31	2.16	2.99	37.85
1915.....	2.45	1.23	0.65	0.88	2.73	3.65	4.91	4.67	3.59	2.01	2.75	2.65	32.17

a No data available.

Infant deaths from gastric and intestinal diseases are largely preventable if babies are given the proper feeding and are properly cared for, especially during hot weather. Breast feeding is the greatest safeguard against these diseases. A large proportion of the babies who died were artificially fed. As will be shown later, many of the foreign-born mothers gave evidence of ignorance of the fundamental requirements of infant feeding. This is noteworthy in connection with the comparatively high mortality rates from these diseases among babies of foreign-born mothers.

In many cities great progress has been made in the prevention of deaths of infants from these causes, through the work of public-health nurses and of infant-welfare stations or centers. Through these agencies the attempt is made to give to all mothers who need help practical knowledge as to the best methods of feeding and care. Mothers are encouraged to continue breast feeding. They are taught how to care for their babies; and when artificial feeding is necessary, it is supervised by a physician, while the mother is taught in her own home by a nurse how to prepare feedings.

RESPIRATORY DISEASES.

Respiratory diseases also were responsible for a relatively large number of infant deaths. As compared with other cities studied by the bureau, Akron had as low a mortality from respiratory diseases as any city studied—equal to the rate in Saginaw. The mortality was less than one-half of that in Johnstown, Manchester, and

New Bedford. The mortality from respiratory diseases among infants of foreign-born mothers in Akron was over twice as high as that among infants of native-born mothers. (Table V.) The greater number of these deaths occurred during the winter months.

SUPERSTITIONS CONCERNING CAUSE OF DEATH.

Some of the mothers believed in old superstitions common to many races. The superstitions that especially affected the well-being of the child were those connected with belief in wicked spirits and in the healing power of charms. The "powwow" doctor, or charm healer, was frequently heard of during interviews with the mothers. These doctors were generally women who took various measurements of the sick person with a string which they either burned or threw into some body of running water. Belief in the efficacy of such treatment was not confined to foreigners. An American mother told how her tenth child was born with the "wasting disease" (marasmus); a "powwow" doctor measured the child when he was 4 weeks old, but without curing him. Later, another "powwow" doctor—a German woman—was called in; she passed her hands over the child, and the very next day he began to improve.

A Hungarian mother gave the following cause for the death of her 3-months-old baby, whose death had been officially reported as from stomach trouble. A neighbor woman, she said, who had just moved near by, came in to see the mother, fixed her eye on the baby, and remarked what a nice fat baby it was; the next day the baby died.

AGE AT DEATH.

Nearly half the infants who died in the first year of life died when less than a month old. Of the total 193 infant deaths, 94 occurred in the first month—33 of them on the first day. A somewhat larger proportion of infants of native mothers died when under 1 month of age than of infants of foreign-born mothers, the proportions being, respectively, 57 and 43 per cent. Thirty-one per cent of the infant deaths were at ages of 3 months and over; 36 per cent of the deaths of infants of foreign-born mothers were at ages of 3 months and over, as contrasted with only 26 per cent of the deaths of infants of native mothers.

The significance of these percentages is brought out more clearly in connection with cause of death. Gastric and intestinal diseases occur usually after the second or third month, and the higher proportion of deaths from gastric and intestinal diseases among infants of foreign-born mothers increases relatively the proportion of deaths after the third month and diminishes the proportion in the first month. Most of the deaths that occur in the first two weeks and a large part of those in the first month are caused by diseases of early infancy.

Chart II.—Percentage of deaths under 1 month of age in the four cities specified.

Akron, Ohio	43.7
Waterbury, Conn.	40.7
New Bedford, Mass.	30.3
Manchester, N.H.	27.9

TABLE VI.—Number and per cent distribution of deaths among infants born during selected year to mothers of specified nativity, according to age at death.

Age at death.	Deaths among infants born during selected year to—					
	All mothers.		Native mothers.		Foreign-born mothers.	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
All ages.....	193	100.0	95	100.0	98	100.0
Under 1 month.....	94	48.7	54	56.8	40	40.8
Less than 1 day.....	33	17.1	20	21.1	13	13.3
1 day but less than 2.....	5	2.6	4	4.2	1	1.0
2 days but less than 3.....	8	4.1	7	7.4	1	1.0
3 days but less than 7.....	12	6.3	6	6.3	6	6.1
1 week but less than 2.....	15	7.8	8	8.4	7	7.1
2 weeks but less than 1 month.....	21	10.9	9	9.5	12	12.2
1 month but less than 2.....	19	9.8	8	8.4	11	11.2
2 months but less than 3.....	20	10.4	8	8.4	12	12.2
3 months but less than 6.....	22	11.6	12	12.6	20	20.4
6 months but less than 9.....	17	8.8	9	9.5	8	8.2
9 months but less than 12.....	11	5.7	4	4.2	7	7.1

STILLBIRTHS.

The percentage of stillbirths in Akron during the selected year was 3, as already stated. Compared with the percentages in other cities studied by the bureau, Akron had a relatively low rate. It is possible that differences in regard to the faithfulness of physicians in reporting stillbirths may exist in these cities. It is difficult to make comparison with other data on account of variations in the definition of stillbirth; in these studies the term includes dead-born issues of seven or more months' gestation.

The proportion of stillbirths was higher among male than among female infants—3.4 as contrasted with 2.5; and it was likewise relatively high among infants born to mothers under 20 and over 35 and among first births and sixth and later births. The stillbirth rate was apparently higher among births to native mothers than among births to foreign-born mothers—3.3 and 2.5, respectively.

Since birth registration in Akron was less than 90 per cent complete and since the canvass might easily fail to secure a complete record of stillbirths, the stillbirth rates by nationality of mother are probably not accurate enough to be of particular significance.

SEX.

Infant mortality rates by sex are shown in Table VII. The mortality of male infants is higher in both nativity groups. Among male infants the rate was 91.9 as contrasted with 79.5 among females.

TABLE VII.—*Births during selected year, infant deaths, infant mortality rates, and per cent of stillbirths, according to sex of infant and nativity of mother.*

Sex of infant and nativity of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	2,322	2,253	193	85.7	69	3.0
Male.....	1,160	1,121	103	91.9	39	3.4
Female.....	1,161	1,132	90	79.5	29	2.5
Not reported.....	1				1	
Native mothers.....	1,402	1,356	95	70.1	46	3.3
Male.....	710	684	49	71.6	26	3.7
Female.....	692	672	46	68.5	20	2.9
Foreign-born mothers.....	920	897	98	109.3	23	2.5
Male.....	450	437	54	123.6	13	2.9
Female.....	469	460	44	95.7	9	1.9
Not reported.....	1				1	

^a Not shown where base is less than 100.

AGE OF MOTHER.

An analysis of births and infant deaths by age of mother shows that the infants of the youngest mothers had the highest mortality. The rate for infants of mothers under 20 was 108.1, as contrasted with 83.7 for all mothers over 20. The rate was also high for mothers from 30 to 34.

TABLE VIII.—*Births during selected year, infant deaths, infant mortality rates, and per cent of stillbirths, according to age of mother at birth of child.*

Age of mother at birth of child.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All ages.....	2,322	2,253	193	85.7	69	3.0
Under 20.....	192	185	20	108.1	7	3.6
20 to 24.....	821	800	67	83.8	21	2.6
25 to 29.....	682	663	53	79.9	19	2.8
30 to 34.....	354	343	31	90.4	11	3.1
35 to 39.....	210	200	15	75.0	10	4.8
40 and over.....	63	62	7		1	

^a Not shown where base is less than 100.

ORDER OF BIRTH.

Order of birth is a factor of infant mortality. The mortality rate among first births in Akron was somewhat higher, 83.3, than among second births, 75.6. For third births it was unusually high, for fourth unusually low, but for fifth and later the rate was consistently high. In general, the results of this study agree with those for other cities in that the rates for first births were somewhat higher than for second, and that rates for the fifth and later births were relatively high.

A study of all births, including births previous to the selected year, to the mothers included in the study shows much the same general trend. The mortality rate among first births was much higher than among second, 125.4 as compared with 107; but, in contrast to the finding for births in the selected year, the mortality from the third pregnancy was not so high as from the first. In general, the mortality among fifth and later births was high. The rate for births eighth and later in order of pregnancy was 167.3, higher than for any preceding order.^a

TABLE IX.—*Births during selected year, infant deaths, infant mortality rates, and per cent of stillbirths, according to number of child in order of birth.*

Number of child in order of birth.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Percent of total births. ^a
All orders.....	2,322	2,253	193	85.7	69	3.0
First.....	823	792	66	83.3	31	3.8
Second.....	559	542	41	75.6	17	3.0
Third.....	339	337	34	100.9	2	.6
Fourth.....	210	207	14	67.6	3	1.4
Fifth.....	146	144	14	97.2	2	1.4
Sixth and seventh.....	148	139	14	100.7	9	6.1
Eighth and later.....	97	92	10	.....	5	.....

^a Not shown where base is less than 100.

CONFINEMENT CARE.

ATTENDANT AT BIRTH.

The attendant at birth is all important in determining the character of confinement care. Out of a total of 2,322 births in Akron, 1,735, or three-fourths, were attended by physicians. Of these, 1,547 were attended by physicians in the homes and 188 by physicians in hospitals. In addition, in 23 cases both a physician and a midwife were in attendance.

Midwives were the only attendants at 505 births, or 22 per cent of the total. Of these, 478 births were to foreign-born mothers.

Over half the births to foreign-born mothers were attended by wives, as contrasted with less than 2 per cent of the births to native mothers (Table X).

TABLE X.—*Births during selected year with specified attendant, according to nationality of mother.*

Nationality of mother.	Births during selected year.			
	Total.	Attended by:		
		Physician.	Midwife.	Other.
All mothers.....	2,322	1,758	505	6
Native mothers.....	1,402	1,367	27	8
Both parents native.....	973	a 955	13	5
One or both parents foreign born.....	423	a 406	14	3
Parentage not specified.....	6	6		
Foreign-born mothers.....	920	391	478	51
German.....	226	b 97	125	4
Slavic.....	192	a 41	122	29
Italian.....	152	c 37	111	4
Magyar.....	109	c 20	82	7
English, Irish, Scotch, and Welsh.....	76	d 76		
Jewish.....	61	d 52	8	1
All other.....	104	d 68	30	6

a 2 mothers who had 2 attendants.

b 7 mothers who had 2 attendants.

c 4 mothers who had 2 attendants.

d 1 mother who had 2 attendants.

The custom of employing midwives was prevalent among foreign-born. That it is not a deep-seated racial custom, however, is shown by the fact that foreign-born women who had less than 2 years of English were less likely to employ midwives than those who had 2 or more years of English. Midwives attended 68 per cent of the births to mothers who were unable to speak English, as compared with 14 per cent of the births to mothers of the same nationalities who had learned to speak English. Probably a chief reason for the prevalence of midwives among foreign-born mothers was that a mother who could not speak English could secure an attendant who could speak her language and could not always secure a physician whom she could talk; the lower charge made by the midwife was also an important reason. The native-born daughters of foreign or mixed parentage were seldom attended by midwives. Only 1 per cent of the 423 births to native mothers one or both of whose parents were foreign born were attended by midwives. It is interesting to note that no foreign-born mothers of English nationality employed midwives as attendants at all.

Under the Ohio law (1283-1, Ohio, 1913) all midwives practicing in the State must be licensed and, in order to obtain a license, must pass an examination in midwifery given by the State board of health. At the time of the study the equivalent of a high-school diploma and a diploma from a legally chartered school of midwifery were required.

standing at the time the diploma was issued were necessary for admission to the State examination; but a license to practice midwifery in a foreign country was also accepted, if approved by the board.

In 57 instances neither physician nor midwife was in attendance, and in 2 cases the attendant at birth, if any, was not reported.

Of the births attended by midwives, 44.4 per 1,000 died in the first month, as contrasted with 40.6 per 1,000 of the births attended by physicians.

TABLE XI.—*Births during selected year, infant deaths, infant mortality rate, and per cent of stillbirths, according to attendant at birth.*

Attendant at birth.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All classes.....	2,322	2,253	193	85.7	69	3.0
Physician.....	1,735	1,681	121	72.0	54	3.1
Physician (at hospital).....	188	180	18	100.0	8	4.3
Physician (not at hospital).....	1,547	1,501	103	68.6	46	3.0
Physician and midwife.....	23	18	2		5	
Midwife.....	505	495	59	119.2	10	2.0
Other, none, or not reported.....	59	59	11			

^a Not shown where base is less than 100.

The infant mortality rate for births attended by physicians was 72 as contrasted with 119.2 for births attended by midwives. The difference in the rates, which cover the period up to one year, is not especially significant, as the attendant at birth—physician or midwife—is responsible only at the birth and during the early days of life of the child. Moreover, most of the midwife cases were among the foreign-born groups, among which the mortality rate, especially from gastric and intestinal diseases, was high.

The high mortality among babies delivered by midwives is probably, then, to be attributed to other causes. Of these births, 95 per cent were born to foreign-born mothers and 69 per cent to mothers who were unable to speak English. A classification according to the district where the child spent the greater part of his first year shows that the midwife cases were drawn largely from factory districts, characterized by poor living conditions.

CONFINEMENT PERIOD.

The length of the lying-in period gives some indication of the mother's ability or willingness to take proper care of herself during confinement, though custom and tradition may also play a part in determining the length of this period. Eight and four-tenths per cent of the mothers stayed in bed less than seven days after the birth of the child; nine-tenths of these mothers were of foreign birth.

A Magyar mother, 32 years old, who had been in this country 1 years, and who could read and write and speak English, told the following story of her sixth confinement. She called in a midwife as soon as she felt that her services would be needed, but the midwife did not come, so the mother, with the "help" of her 5-year-old daughter, delivered the baby herself. One-half hour after the birth the mother went to bed and stayed there until the following morning. Then she got up, prepared breakfast, attended to the needs of three children, and went back to bed. Later in the day a doctor was called in; he examined the mother and child and pronounced everything satisfactory. For the first two days the mother did all the housework that had to be done, resting all she could. On the third day she finished a washing which had been in progress when the baby was born, carrying the wash water from the third house down the street.

A Bohemian mother, 28 years old, who had lived in this country 14 years, reported that her fourth child had been born on a Saturday at 3 p. m. During the night he began to cry, and, as her milk had not come, the mother got up at midnight, made some tea, and gave it to the child. On Monday she did her usual week's washing and scrubbing, getting some help in hanging out the clothes.

In another case, the midwife was told on the third day after the confinement that her services were no longer needed. On that day the mother began to do some housework and within a week was doing it all. She reported that she had suffered from a lame back ever since and thought that perhaps she had not rested enough after the confinement.

General Table 15 shows that the native mother as a rule rested longer time after confinement than the foreign-born mother, and that in each nativity group the infant mortality rate was higher the shorter the period of rest. The relatively high rate among the group resting longer than 15 days is probably due to the fact that these groups include a disproportionate number of the abnormal confinement cases.

MATERNAL MORTALITY.

Perhaps nothing militates so strongly against an infant's chance to survive his first year as the mother's death. Within the group studied and during the year following the birth of the baby 1. deaths occurred among 2,306 mothers; 4 of these deaths occurred during the first month after confinement—2 of these and 2 others occurring within the second month were probably due to childbirth. This is a comparatively low mortality rate from conditions connected with childbearing, being less than 3 deaths per 1,000 births.

FEEDING.

In Table XII is shown the change in type of feeding for the first nine months of life. The term type of feeding refers to the feeding

predominating during the month specified. Breast feeding means that no kind of food other than mother's milk was given; mixed, that breast milk was supplemented by some other kind of food; and artificial, that no breast milk was given. In the first month of life, disregarding the infants who died in the month, 90 per cent of the infants were breast fed exclusively. This proportion gradually decreased until in the sixth month 55 per cent were breast fed and in the ninth month only 29 per cent. A total of 163 infants were artificially fed from birth.

The respective proportions of infants of native mothers and of foreign-born mothers who were breast fed are shown in Table XIII. In each month of life a slightly larger proportion of the infants of foreign-born mothers were breast fed exclusively. The same tendency is brought out also in Table XIV, which shows that in each month of life a somewhat larger proportion of infants of native mothers were artificially fed. Among the different foreign nationalities some variation in the custom of feeding appears. The Italian and Slavic mothers had the lowest percentages of infants artificially fed, while the German mothers and the group of all other nationalities, which includes a considerable number of Magyars, had percentages somewhat above the average for the infants of all foreign-born mothers (Table XV).

TABLE XII.—*Number and per cent of infants surviving at end of specified month of life who were breast fed during the month.*

Month of life.	Total infants.	Infants breast fed exclusively.	
		Number.	Percent.
First.....	2,159	1,936	89.7
Second.....	2,140	1,743	81.4
Third.....	2,120	1,582	74.6
Fourth.....	2,106	1,393	66.1
Fifth.....	2,096	1,290	61.1
Sixth.....	2,088	1,149	55.0
Seventh.....	2,082	881	42.3
Eighth.....	2,077	754	36.3
Ninth.....	2,071	596	28.7

TABLE XIII.—*Number and per cent exclusively breast fed among infants born to mothers of specified nativity and surviving at end of specified month of life.*

Month of life.	Infants of native mothers.			Infants of foreign-born mothers.		
	Total.	Breast fed exclusively.		Total.	Breast fed exclusively.	
		Number.	Per cent.		Number.	Per cent.
First.....	1,302	1,162	89.2	857	774	90.3
Second.....	1,294	1,044	80.7	846	699	82.6
Third.....	1,286	945	73.5	834	637	76.4
Fourth.....	1,278	827	64.7	828	566	68.4
Fifth.....	1,276	765	60.0	820	515	62.8
Sixth.....	1,274	694	54.5	814	455	55.9
Seventh.....	1,272	535	42.1	810	346	42.7
Eighth.....	1,270	459	36.1	807	295	36.6
Ninth.....	1,265	360	27.7	806	245	30.4

TABLE XIV.—*Number and per cent artificially fed among infants born to native and to foreign-born mothers and surviving at end of specified month of life.*

Month of life.	Infants of native mothers.			Infants of foreign-born mothers.		
	Total.	Artificially fed.		Total.	Artificially fed.	
		Number.	Per cent.		Number.	Per cent.
First.....	1,302	111	8.5	857	52	6.1
Second.....	1,204	173	14.4	846	69	8.1
Third.....	1,286	243	18.9	834	98	11.8
Fourth.....	1,278	297	23.2	828	114	13.8
Fifth.....	1,275	321	25.2	820	126	15.4
Sixth.....	1,274	343	26.9	814	139	17.1
Seventh.....	1,272	369	29.0	810	153	18.9
Eighth.....	1,270	387	30.5	807	176	21.8
Ninth.....	1,265	410	32.4	806	204	25.3

TABLE XV.—*Per cent of infants, of mothers of specified nationality, artificially fed in month specified.*

Month of life.	Per cent of infants artificially fed.				
	All foreign-born mothers.	German mothers.	Italian mothers.	Slavic mothers.	Other.
Third.....	10.9	11.3	8.1	7.4	11.1
Sixth.....	16.7	19.4	14.4	12.6	18.1
Ninth.....	25.2	26.3	27.5	18.3	27.1

Analysis of the kind of feeding by earnings of father indicates that in the lower earnings groups a much smaller proportion of the infants was artificially fed. In the group where the fathers earned \$1,250 and over, more than one-fifth of the infants were artificially fed in the third month and over two-fifths in the ninth. Evidently the higher mortality among the infants in the lower earnings group occurs in spite of a smaller proportion of infants artificially fed.

A comparison of Akron figures with those for Johnstown on the question of type of feeding shows that Akron babies of native mothers were exclusively breast fed to a much greater extent than the babies of native mothers in Johnstown and that, though in the first three months not so large a proportion of foreign-born mothers in Akron nursed their babies as of foreign-born mothers in Johnstown, yet those who did nurse their babies continued it longer.⁵

MORTALITY RATES, BY KIND OF FEEDING.

In order to show the difference in mortality by kind of feeding, monthly death rates have been calculated for each month of life. In the first column of the table the tendency toward decrease in mortality as the year advances is shown very clearly. In the first

⁵ General Table 17.

month 43 deaths per 1,000 births occurred, or if infants who died without having been fed are excluded, 23 per 1,000 infants who were fed died during the month. The mortality decreased rapidly to 9 per 1,000 in the second month, and after the third fell off gradually until in the tenth to the twelfth months an average of less than 2 per 1,000 died. The next columns show the great disproportion in mortality for the breast-fed and artificially-fed infants. In the first month 20 per 1,000 infants who were breast fed died as compared with 55 per 1,000 infants who were artificially fed. In the later months, however, the difference is even greater. In the second month the artificially fed had a mortality six times as high as that among the breast-fed infants, and throughout the nine months of life the mortality for the artificially fed is maintained at over four times the rate for the breast-fed infants.

This contrast in mortality may be expressed in another way. If to 1,000 infants who lived to be fed are applied the monthly death rates for breast-fed infants there would be 960 surviving at the end of the year—a mortality of 40.3 per 1,000. Applying in a similar manner the rates for the artificially-fed infants only 830 would survive at the end of the year, giving a mortality rate of 170.2 per 1,000. Thus the rate of infant mortality among the artificially fed is shown to be more than four times that of the breast-fed infants.

TABLE XVI.—Deaths in the month per 1,000 survivors at beginning of month and monthly death rates per 1,000 infants fed in specified way, by month of life.^a

Month of life.	Deaths in month per 1,000 survivors at beginning of month.	Deaths in month per 1,000 infants.	
		Breast fed.	Artificially fed.
First.....	^b 22.2	20.1	55.2
Second.....	8.8	5.2	33.1
Third.....	9.3	5.1	20.8
Fourth.....	6.6	2.9	21.9
Fifth.....	5.2	2.3	17.9
Sixth.....	3.3	.9	6.2
Seventh.....	2.9	1.1	9.6
Eighth.....	2.4	1.3	5.3
Ninth.....	2.9	.....	4.9
Tenth to twelfth (average).....	1.8	.6	2.2

^a Derived from General Table 18.

^b The rate is per 1,000 infants who lived to be fed. The rate per 1,000 live births is 41.7; 45 infants died not fed.

A review of the mothers' answers to the question, "What did you feed the baby?" shows in many cases ignorance of the underlying principles of proper infant feeding and a tendency among certain mothers, especially the foreign born, to express maternal love by sharing with the baby whatever they themselves especially liked to eat or drink. For instance, the mothers—chiefly from southeastern Europe—of 131 babies reported giving coffee to the baby beginning any time from birth to the end of the twelfth month. The amount

of course, was slight, just enough to flavor the bottle of milk or to soften a piece of cracker, bread, or cake. Tea was not so popular, only 28 cases of baby tea drinkers being reported. A few young children were seen drinking beer, but only eight mothers—six of them Slavic—reported having given beer to the baby before it was 1 year old.

Meat, especially bacon, was also considered a special treat for the baby. A Slavic mother said that her baby was so fond of bacon that she could not afford to give him all he wanted, and to fool him soaked bread in lard and gave it to him to suck. A native mother said that she gave her 3-months-old baby meat, and he liked it so much that afterwards whenever he saw meat he screamed for it and had to be given some. Many a mother firmly believed that colic could be avoided by feeding the baby tastes of everything she herself ate while nursing him and so accustoming the baby's stomach to what she believed to be the ingredients of her breast milk. The mother of 414 babies, according to their own testimony, gave the babies family diet beginning any time from the third month on. Some elaborated on the phrases "family diet," "table diet," "everything I eat," by adding "even cabbage," "fried eggs," "fried potatoes," "onions," and one child was reported as having so strong a liking for anything sour that, although only 10 months old, he had to be given sauerkraut.

In some cases, even though the diet was more limited, it was far from scientific; for example, a 3-months-old baby was fed apricot pie because he wanted it. A Slovak mother 25 years old reported that the day after the birth of her fourth child she masticated some cake, fed it to the baby, and then gave him coffee with which to wash it down.

The importance of these statements of infant feeding lies in the fact that they show that over 500 mothers made statements indicating that they were ignorant of the accepted principles of infant feeding, or, if familiar with them, did not practice them.

This ignorance or indifference was not confined to foreign-born women, although they formed the larger proportion of the mothers who gave food unsuited to the age of the baby. A native mother reported that she gave her 2-weeks-old baby ice cream, and that before his sixth month he was sitting at the table "eating everything." When 11 months old he had spasms, and the mother did not know why but the doctor advised her not to give the baby solid food; and after the illness the baby did not want anything but bread and cereal.

ECONOMIC STATUS OF FAMILY.

The economic status of the family depends in the main upon the earnings of the father. These earnings are affected by the industrial

conditions in the city, by the amount of unemployment, and by the degree of skill possessed and for which there is a market. One-half of all the families in Akron were dependent directly upon the rubber factories for their living. A large proportion of the remainder were indirectly dependent upon these factories, as they were employed in industries furnishing products necessary for the rubber factories, foundry and machine shops being the most important. Besides these the clay-product factories (sewer pipe and stoneware), and cereal and flour mills claim attention as important factors in the employment situation of the city.

GENERAL INDUSTRIAL CONDITIONS.

Conditions in industry bear a direct relation to the welfare of the children, affecting either the financial condition of the family or the physical welfare of the breadwinner, or both. During part of the period of the study the rubber factories, upon which such a large proportion of the families in Akron depended directly or indirectly for their living, were affected by the depression following the outbreak of the war; but later, after about January 1, 1915, these factories had to work day and night shifts in order to meet the heavy demand. The demand for labor was so urgent, at least in the latter part of the period under study, that the manufacturers had to pay attractive wages in order to secure and keep a sufficient supply of labor.

POVERTY.

That Akron had relatively few cases of real poverty during the period of the study is indicated by the report of the charity organization society for the nine months ended December 31, 1914. This society, besides its own charity work, had charge of the city relief work. Although this period included five months of financial depression and distress following the opening of the European war only 478 families were given material relief through public charities.

EARNINGS OF FATHER.

Over two-thirds of the births occurred in families where the fathers were engaged in manufacturing and mechanical pursuits and over one-half of these in families where the fathers worked in factories, chiefly in rubber industries.

In Table XVII is shown the distribution of births according to earnings of the father. The greatest number of births occurred in the group where the fathers earned between \$650 and \$850. Of the total births, 47.1 per cent were in families where the father earned over \$850.

Akron had a much higher wage scale than the other cities in which infant mortality studies had been made by the bureau. In New Bedford 37.7 per cent of the births were in the earnings group under

\$550, in Manchester 30.4 per cent, and in Waterbury 36.8 per cent; but of the births in Akron only 16.1 per cent were in this group. Similarly Akron showed in her proportion of births in the higher earnings group, \$1,250 and over, 13.2 per cent as contrasted with the proportions in New Bedford, Manchester, and Waterbury, which were 6.5, 6.4, and 8.7, respectively.

TABLE XVII.—*Number and per cent distribution of births in selected year to mothers of specified nativity, according to earnings of father.*

Earnings of father.	Total births.		Births to native mothers.		Births to foreign-born mothers.	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
All classes	2,322	100.0	1,402	100.0	920	100
Under \$450	211	9.1	51	3.6	160	17.1
\$450 to \$549	163	7.0	41	2.9	122	13.3
\$550 to \$649	228	9.8	83	5.9	145	15.8
\$650 to \$849	581	25.0	325	23.2	256	27.8
\$850 to \$1,049	523	22.5	306	21.8	217	23.6
\$1,050 to \$1,249	264	11.4	224	16.0	40	4.3
\$1,250 and over	307	13.2	267	19.0	40	4.3
No earnings	19	.8	6	.4	13	1.4
No report	26	1.1	9	.6	17	1.8

INFANT MORTALITY AND EARNINGS OF FATHER.

The coincidence of low earnings of father and high infant mortality is shown in Table XVIII. The highest rates are for the groups "under \$450" and "\$450 to \$549," for which the rates were 117.1 and 118.0 respectively. For the groups above \$550 the mortality rate fell with a single irregularity until it reached a minimum of 40 for the group "\$1,250 and over." As the father's earnings increased the infant mortality rate diminished.

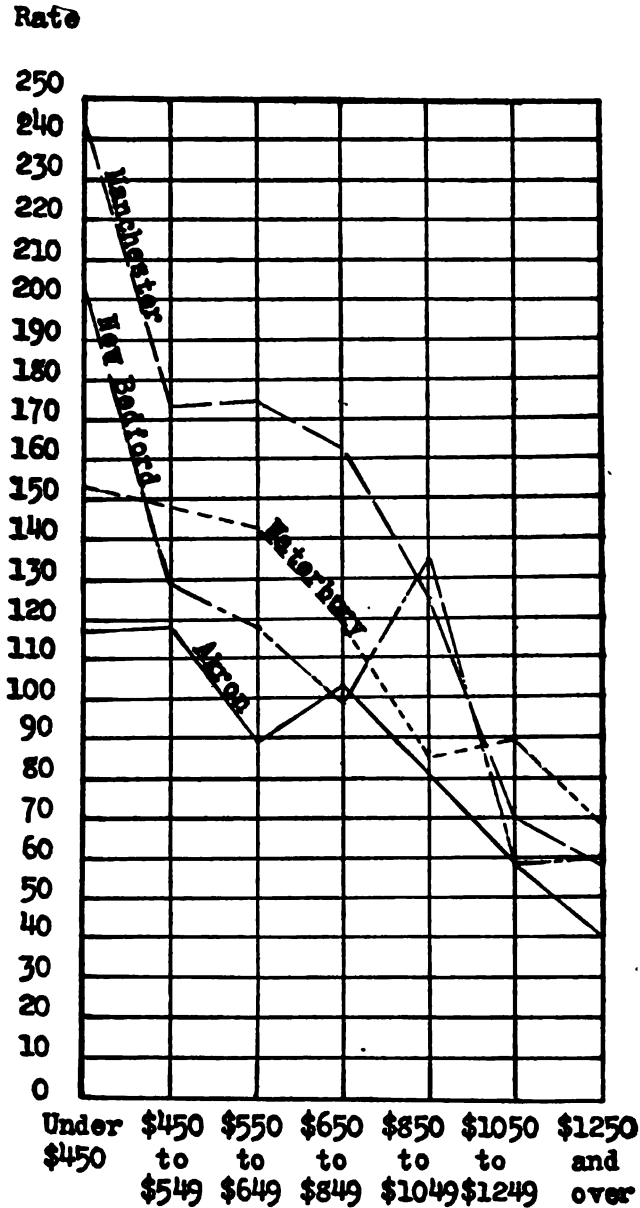
TABLE XVIII.—*Births during selected year, infant deaths, infant mortality rates, per cent of stillbirths, according to earnings of father.^a*

Earnings of father.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^b	Stillbirths.	
					Number.	Per cent of total births.
All mothers	2,322	2,253	193	85.7	69	3.0
Under \$450	211	205	24	117.1	6	2.8
\$450 to \$549	163	161	19	118.0	2	1.2
\$550 to \$649	228	223	20	89.7	5	2.2
\$650 to \$849	581	563	58	103.0	18	3.1
\$850 to \$1,049	523	500	41	82.0	23	4.4
\$1,050 to \$1,249	264	257	15	58.4	7	2.7
\$1,250 and over	307	300	12	40.0	7	2.3
No earnings	19	18	1	.....	1	.....
Not reported	26	26	3	.....	.....	.....

^a For native and foreign-born mothers see General Table 21. ^b Not shown where base is less than 100.

This relation is brought out graphically in Chart III, which shows the relation of infant mortality rates and earnings of fathers in the different cities.

Chart III.—Infant mortality rates according to father's earnings for the four cities specified.



This relationship also finds expression in the high infant mortality rates, 165, 123, and 130, respectively, in Manchester, Waterbury, and

New Bedford—cities which had relatively low wage scales. Brockton, Saginaw, and Akron with relatively high wage scales had comparatively low infant mortality rates, 97, 85, and 86, respectively.

As shown previously, the mortality rate for infants of foreign-born mothers was considerably higher than for infants of native mothers. A distribution of births in each of these groups by earnings of father shows that the families of foreign-born mothers had relatively a much lower economic status than those of native mothers. In the native group only 12.5 per cent of the births occurred in families where the fathers earned less than \$650 during the year, as contrasted with 46.5 per cent of the births in the foreign-born group which occurred in families of this earnings class. But it is interesting to note that in each earnings group for which rates are shown the mortality was higher among infants of foreign-born mothers than among those of native mothers, indicating that other causes besides father's earnings play a part in the difference in rates by nativity.

In both the native and the foreign-born groups the mortality rates fell, with a few slight irregularities, as the father's earnings increased.

In the earnings group "\$650 to \$850" the infant mortality rate for the foreign-born was 135.5, higher even than that prevailing in the income group "under \$450." For this group housing conditions were relatively bad. General Table 20 shows that 50 per cent of the fathers in this group were factory operatives and factory laborers; a large proportion of them lived near the factory and under some of the worst living conditions that Akron presented. A study of the location of the homes of the foreign-born mothers whose husbands' yearly earnings were between \$650 and \$850 proved that they were either in the districts containing the large factories or in adjoining districts.

A decrease in infant mortality as the father's earnings increase is shown when all births to the mothers included in the study are considered, classified according to the earnings of the fathers during the selected year. The mortality was highest, 162, for the group less than \$550 and lowest, 77.9, for the group earning \$1,250 and over. The decrease from group to group is somewhat more regular than in the figures of the selected year.

EARNINGS OF FATHER AND GAINFUL EMPLOYMENT OF MOTHER.

The proportion of mothers gainfully employed during the year after the infant's birth varies with the earnings of the father. The lower the father's earnings the more need there is for the mother to supplement the family income with gainful work. This relationship is shown in Table XIX, in which the proportion of working mothers declines as the yearly earnings of the fathers increase. The percentage of mothers employed decreased from 51 in the group where

the father's earnings were under \$450 to 14 in the group where the father's earnings were \$1,250 and over.

Chart IV.—Percentage of mothers gainfully employed during year following infant's birth, by nativity, according to earnings of father.

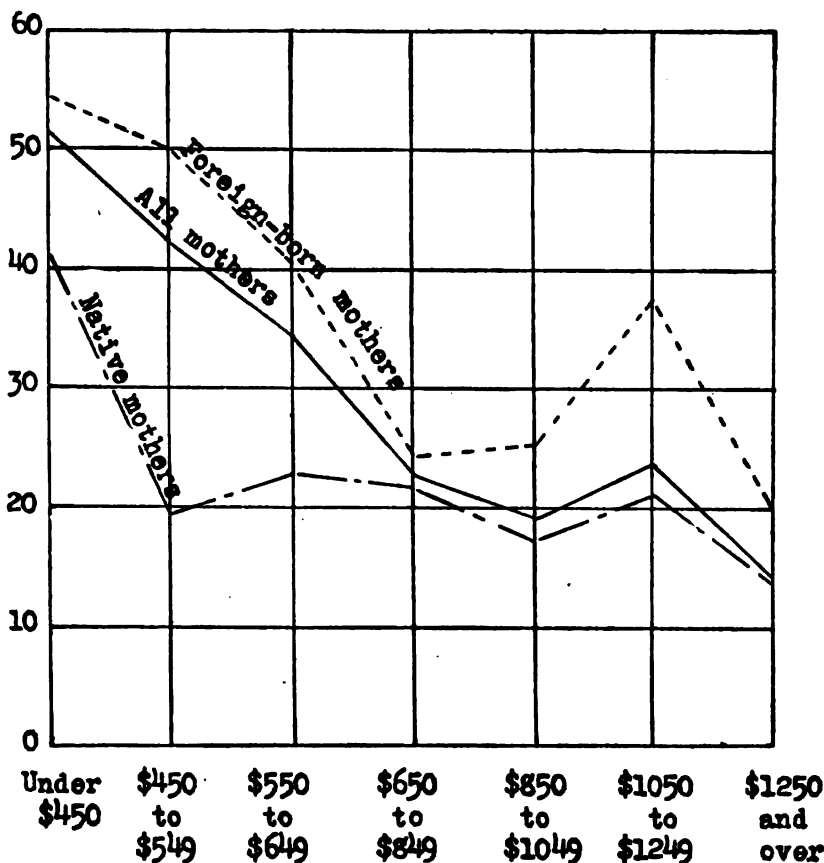


TABLE XIX.—Number and per cent of births to mothers of specified nativity gainfully employed during year following infant's birth, according to earnings of father.

Earnings of father.	Births to all mothers.			Births to native mothers.			Births to foreign-born mothers.		
	Total.	Gainfully employed.		Total.	Gainfully employed.		Total.	Gainfully employed.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
All classes.....	2,322	614	26.4	1,402	275	19.6	920	339	36.8
Under \$450.....	211	108	51.2	51	21	.....	160	87	54.4
\$450 to \$549.....	163	69	42.8	41	8	.....	122	61	50.0
\$550 to \$649.....	228	78	34.2	53	19	.....	145	59	40.7
\$650 to \$849.....	581	133	22.9	325	71	21.8	256	62	24.2
\$850 to \$1,049.....	523	100	19.1	396	68	17.2	127	32	25.2
\$1,050 to \$1,249.....	284	62	23.5	224	47	21.0	40	15	.....
\$1,250 and over.....	307	44	14.3	267	36	13.5	13	8	.....
No earnings.....	19	12	.....	6	4	.....	13	8	.....
Not reported.....	26	8	.....	9	1	.....	17	7	.....

* Not shown where base is less than 100.

GAINFUL EMPLOYMENT OF MOTHER.

Slightly over one-fourth (28 per cent) of the mothers included in this study were gainfully employed during some part of the year preceding the birth of their babies; but in most cases the work did not take the mother out of the home. Mothers of only 175 infants worked away from home during the year before the baby's birth. In the year after the confinement the mothers of 26 per cent of the babies did gainful work, slightly less than the proportion of mothers at work during pregnancy. This work, however, required leaving the baby in care of some one besides the mother in only 37 cases. In only 58 instances did the mother work away from home during the year following the birth of the baby, and in 21 of these the mother did not resume work until after the baby had died.

The reasons for the small amount of employment are chiefly relatively high wages earned by the fathers, and comparatively few opportunities for woman labor in the industries of the city. In this connection the Ohio mothers' pension law should be mentioned.* This law provided that mothers who were the sole breadwinners in their families, if they had small children, might receive a pension to enable them to remain with the children. According to the pay roll in the county treasurer's office, in September, 1915, 103 mothers were drawing pensions, of whom probably three-fourths lived in Akron.

The compensation and insurance regulations of the rubber factory which employed the largest number of women stated that the company did not encourage the employment of married women. Provision was made, however, in the benefit scheme for disability due to pregnancy. The mother of a legitimate child was allowed compensation up to 13 weeks, providing she had refrained from work at least 8 weeks before confinement and had been attended by a registered physician during confinement. Before giving work to a married woman this company always made inquiry into home conditions. If the husband was able to work, an effort was made to convince him of the desirability of arranging matters so that his wife might remain at home; in many instances he was transferred to another job providing better wages in order that he might be able to earn enough for the support of his family. The woman physician in this factory urged mothers to remain at home at least until the proper time for weaning their babies had come, and until the babies had become fully accustomed to bottle feeding. As mentioned above, their return to the factory was discouraged.

* Laws of 1913, ch. 8, pp. 877-879, as amended by laws of 1915, pp. 436-437. Pensions not exceeding \$15 a month for one child and \$7 a month for each additional child are granted by the juvenile court to mothers whose husbands are dead, permanently disabled, or prisoners, or whose husbands have deserted for three years, providing these mothers are poor and the children are not old enough to receive an age and schooling certificate.

GAINFUL EMPLOYMENT OF MOTHER AND INFANT MORTALITY.

In Table XX are shown rates of infant mortality according to whether or not the mother was gainfully employed during the year before the infant's birth. The mortality among infants whose mothers were gainfully employed was 107.4 as contrasted with only 77.2 where the mothers were not employed. The mortality among infants whose mothers were gainfully employed at home appears higher than that for infants whose mothers were employed away from home, the rates being 114.5 and 88.2, respectively:

None of the 37 infants whose mothers resumed work away from home during the lifetime of their infants died in the first year of life.⁷

TABLE XX.—*Total births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to gainful employment of mother at home and away from home during year before infant's birth, and nativity of mother.*

Employment of mother during year before infant's birth, and nativity of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	2,322	2,263	193	85.7	69	3.0
Not gainfully employed.....	1,666	1,620	125	77.2	46	2.8
Gainfully employed.....	656	633	68	107.4	23	3.5
At home.....	481	463	53	114.5	18	3.7
Away from home.....	175	170	15	88.2	5	2.9
Native mothers.....	1,402	1,356	95	70.1	46	3.3
Not gainfully employed.....	1,125	1,090	69	63.3	35	3.1
Gainfully employed.....	277	266	26	97.7	11	4.0
At home.....	216	207	18	87.0	9	4.2
Away from home.....	61	59	8	.....	2	.....
Foreign-born mothers.....	920	897	98	109.3	23	2.5
Not gainfully employed.....	541	530	56	105.7	11	2.0
Gainfully employed.....	379	367	42	114.4	12	3.2
At home.....	265	256	35	136.7	9	3.4
Away from home.....	114	111	7	63.1	3	2.6

^a Not shown where base is less than 100.

EMPLOYMENT HISTORY.

A slightly larger percentage of native mothers than of foreign-born mothers had never been gainfully employed. It is interesting to note that the percentage of mothers never gainfully employed was higher in the Italian and Jewish groups than in the group of native mothers of native parentage. The foreign-born women were as a rule unaccustomed to factory work. Only 27 per cent of the mothers who had ever worked in a gainful occupation outside the home for more than one year reported factory work as the chief occupation. Fifty-five per cent of the foreign-born mothers in the same group reported domestic service and 17 per cent farm work.

⁷ At average infant mortality rates for the city, applied to these infants at their ages when the mother commenced work, there would have occurred 0.7 deaths among this group. The fact that no deaths occurred is therefore not of particular significance, in view of the small size of the group.

Only about one-sixth of the mothers supplemented the father's earnings by taking lodgers and few did it on a commercial scale; less than two-fifths of the mothers who kept lodgers at any time during the selected year had more than three. A larger proportion of foreign-born mothers kept lodgers during the selected year than of native mothers, and the proportion of Italian mothers who kept lodgers was higher than that of any other nationality.

HOUSING.

Akron was predominantly a city of one-family houses; according to figures obtained in the preliminary canvass of the city, during which every dwelling in the city was visited, 84 per cent of the inhabited houses were in this class. The great majority of these were detached, five- or six-room frame houses, usually of two stories, with cellar, water and sewer connections, and usually individual yards.

In an unusually large proportion of cases the people owned or were buying their homes, which naturally meant a deeper interest in the outside appearance of the houses. The amount of home ownership is in general a good index of financial prosperity, and in this respect Akron had an unusually favorable record. The United States Census in 1910 credited Akron with 50.4 per cent of home owners, the highest percentage of any city of its group—60,000 to 80,000 population—and one of the highest among all cities of over 60,000. The families of 34.9 per cent of the babies included in this study owned their own homes. Foreign-born fathers were home owners to a somewhat greater extent than native fathers. In this connection it should be mentioned that one of the rubber factories had organized a building company and had built small, attractive, up-to-date one-family houses which could be bought on easy terms. Reduced rates were made to employees of the factory and special precautions were taken to prevent the houses from falling into the hands of speculators.

The city was clean and tidy, yards were well kept up, garbage was carefully disposed of, trees and gardens even in rather poor neighborhoods were frequent.

In Akron the general status of a neighborhood is closely connected with the topography, for it is a city of hills and valleys. There are two main areas of low land—the valley of the Little Cuyahoga River, which extends all along the eastern edge of the city and across the northern end, and the shallower depression from Summit Lake through the center of the city, through which runs the Ohio Canal. These two valleys join a little north of the business section. The Little Cuyahoga River Valley is from 100 to 200 feet deep and from one-half to 1 mile wide. Its lower levels are damp and subject to

floods; here were found some of the worst living conditions in Akron. North of the river, North Hill rises rather abruptly; from the top of this rise a stretch of high land extends far beyond the city limits. The Ohio Canal Valley is shallower and much broader, taking in most of the central part of the city from the chain of hills—West, Perkins, and Sherbondy—on the western edge to the East Akron Hill.

As a general rule, insanitary conditions, including bad housing, were found in the low-lying sections. To the east, owing to the congestion in the center of the city, the limit of the area of bad conditions was located farther up the hill than in other parts of Akron; but this was the most important exception to the rule. Bad housing conditions, in some respects the worst in the city, existed in the apartments over stores along the business and factory streets; but these streets were for the most part in the valleys.

A number of well-built-up and otherwise well-conditioned streets were lacking, however, in sewer or water installation; and until the summer of 1915 a satisfactory water supply had been out of the reach of the great majority. Furthermore, in certain parts of the city insanitary conditions of all kinds were found—bad housing, bad drainage, and offensive refuse dumps.

LOT AND BLOCK CROWDING.

Rear houses were common in Akron, but in most neighborhoods they did not create a sanitary problem. In the ordinary instance two detached one- or two-family houses were placed on a fairly deep lot, far enough from each other and from the neighboring houses to have ample light and air, even if perhaps not all the privacy that might be desirable. Akron was rather irregularly laid out, with many abnormally deep lots; on these houses were often built more than one deep; in such circumstances a private street or court was sometimes opened up to give access to the rear houses. A number of instances were observed where houses were much too close together, and there were indications that this evil would grow with the growth of the city, unless something was done to prevent.

Whole blocks in the center of the city were overcrowded also, both with houses and with people. Three such blocks might be mentioned. One was a notable example of a block "cluttered up" with houses; it housed 193 persons in 36 dwellings on an area of about 2.4 acres. The second, the most closely built up and also the smallest of the three (approximately 144 by 312 feet, or a little less than 1 acre), had 20 dwellings, inhabited by 157 persons. The block immediately adjoining this on the south housed 355 people in 37 dwellings, on an area approximately 312 feet square, about 2½ acres. Both these blocks were located near the largest rubber factory, were

full of lodging houses, and probably showed as great a density of population as any considerable area in Akron. There were no large tenement houses in either of these blocks; a few tenement houses were of brick, with stores on the first floor, but most of the houses were small, shabby, wooden buildings.

In another locality, where the population was reputed to be especially dense, the houses were set four, five, and even six deep up the side hill; here 437 persons lived in 59 houses, on an area of about 6½ acres. There was only one large house in this block—a brick tenement; the other houses were practically all small frame buildings, though many of them were occupied by more than one family. The most unfortunate feature of the situation was that the thoroughfare giving access to the rear houses had been appropriated by the railroad, so that the persons living in them had no access to their homes except by a footpath along the railroad tracks or by sufferance through the yards of their neighbors.

The head of the local fire underwriters' bureau stated that the worst district for fire hazard was from the main business section north to the foot of the hill. Although a business section, it still contained many old, wooden buildings in very poor repair, the living quarters in which were let to a poor class of tenants. In one small area in this section, 627 persons were found living in 72 houses, most of them, it is safe to say, amid extremely undesirable surroundings. In this neighborhood the demolition of many old buildings had been ordered by the State fire marshal.

HOUSING REGULATIONS AND ENFORCEMENT.

Municipal corporations are given the power—

To regulate the erection of buildings and the sanitary condition thereof, the repair of, alteration in and addition to buildings, and to provide for the inspection of buildings or other structures and for the removal and repair of insecure buildings.*

Akron adopted a building code on February 1, 1911; this was revised without material changes in February, 1914. Under the provisions of the ordinance (secs. 1 and 2) the city had in 1915 a building inspection department with the officials here listed, at the salaries given:

Building inspector.....	\$2, 000
Assistant building inspector.....	1, 000
Sanitary (plumbing) inspector.....	1, 500
Electrician (electrical inspector).....	1, 500
Clerk.....	720

In 1913 and 1914 there were an assistant sanitary inspector and an assistant electrician at salaries of \$1,000 each; but in the first months of 1915 building was very slack, and the council amended

* General Code 1910, sec. 3636, amended by Laws of 1913, p. 263.

the ordinance by eliminating these two officials. There was also an unsalaried board of appeal, consisting of an architect, a structural engineer, and a builder, appointed by the mayor with the approval of the council. This board heard and decided all appeals from the decisions of the building inspector (sec. 7).

The main provisions of sanitary interest are: (a) Requirements applicable to all dwellings that water-closets for all new buildings must be inside (sec. 382), that no new cesspools, vaults, or privies should be constructed on sewered streets (secs. 411 and 418), and that existing vaults where there is a "main sewer" should be abandoned (sec. 418); (b) limitation of lot occupancy by new tenement houses (defn., sec. 41), hotels, and lodging houses (sec. 420); and (c) requirements applicable only to new tenement houses as to provision of light, air, water supply, and toilet facilities (secs. 422-430 and 433-439).

Attention should be called to the fact that houses sheltering fewer than three families are affected only by the first set of requirements; a dwelling, or a group of dwellings and outhouses, or a dwelling over a store, might, so far as the ordinances are concerned, occupy the whole of an inside lot, or have dark rooms or rooms with windows on the lot line (instances of this were found), or dispense with water connections or toilet facilities.

Apparently the prohibition against new privies or outside water-closets was generally obeyed; the same can not be said of the removal of old vaults. The sanitary inspector of the health department stated that in actual practice no one was required to install sewer connections unless the neighbors complained of the condition of a privy vault; in case of complaint, the matter was taken up by the health department and the owner was required to put in a water-closet within such period as it appeared he was financially able to do so. There was no routine of enforcing the elimination of privy vaults after a sewer was laid, nor were connections required to be made within any specified time thereafter.

The building inspector stated that it took practically all his time and that of his assistant to examine and pass upon plans submitted to them in the office, and hence they were unable to make field inspections. He also stated that they devoted most of their time to new building and only occasionally attempted to clean up insanitary conditions in old tenements.

RENTALS.

In the mind of the ordinary householder, the most serious housing problems in Akron were high rents and scarcity of houses. In the five years preceding this study building operations had not kept pace with the growth of population; as previously mentioned, few houses had been built for rent; and, except for a few months in 1914 and 1915,

it was difficult for prospective tenants to find quarters; during the latter part of 1915 it became practically impossible. Rentals amounted to at least \$4 per room per month; lower figures than this applied only to houses without bathrooms and usually without water-closets, furnaces, or other conveniences. These values held about the same all over the city, except on West Hill, which was markedly more expensive; practically the same prices were charged for miserable quarters in the poorest parts of town as were paid for much better accommodations in more desirable localities farther out. A family that could afford \$18 or \$20 a month for rent could have a reasonably well-built five-room detached cottage with cellar and bathroom in the outlying sections of the city; e. g., on North Hill, away from the car line, though vacancies in such houses were few and hard to find. But anyone who had to have cheaper quarters than this faced a serious lack. There seemed to be no satisfactory three- or four-room houses for rent, and three-room tenements cost from \$12 up—often as high as \$15 or even \$17 for rooms without adequate light or private toilet facilities.

The cause of high rents seemed to have been a house scarcity rather than a land scarcity. It was stated by a member of a real-estate firm dealing largely in rented property that detached houses could not be rented profitably at prices which workingmen could pay, i. e., at prevalent Akron prices; and that tenants would have to resort more and more to flats and terraces.

CONDITIONS UNDER WHICH BABIES INCLUDED IN THE STUDY LIVED.

That the sanitary conditions surrounding the home affected the child's chance of surviving his first year has been suggested by the description of the districts in which infant mortality was highest. In addition to this general description certain facts were secured for the home in which the child spent the great part of his first year—in case of stillbirth, the home in which the mother spent the great part of her period of pregnancy. The principal items of interest are the sanitary conveniences of these homes and the amount of room overcrowding.⁹

The sanitary conveniences of the homes are shown in Table XXI. In nearly three-fourths of the homes the city water supply had been introduced into the dwelling. In over half the cases—in 56.4 per cent of the births included in the study—no bathtub was reported in the home. Of the total number of births, 57.4 per cent were in families where there was a water-closet in the house. In 145 instances sewer-connected privies were used, and in 843 instances privies not connected with the sewer. In 1 case no toilet was reported.

⁹ Since the study was made, according to the board of health, the city has been actively engaged in the installation of sewerage and plumbing systems, so that a large percentage of homes now have sanitary conveniences.

TABLE XXI.—*Number and per cent distribution of births during selected year to mothers of specified nativity, according to sanitary conditions of dwelling.*

Sanitary condition of dwelling.	Total births.		Births to native mothers.		Births to foreign-born mothers.	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total dwellings	2,322	100.0	1,402	100.0	920	100.0
Water supply:						
In dwelling	1,682	72.4	1,093	78.0	589	64.0
Not in dwelling	640	27.6	309	22.0	331	36.0
Bath:						
In home	1,010	43.5	765	54.6	245	26.6
Not in home	1,310	56.4	636	45.4	674	73.3
Not reported	2	.1	1	.1	1	.1
Type of toilet:						
Water closet	1,332	57.4	909	64.8	423	46.0
Sewer-connected privy	441	19.0	242	17.3	199	21.6
Other privy	547	23.6	249	17.8	298	32.4
No toilet	1	.....	1	.1	.....	.....
Not reported	1	.....	1	.1	.....	.....
Sewer-connected:						
Sink connected	1,648	71.0	1,073	76.5	575	62.5
Sink not connected	672	28.9	327	28.3	345	37.5
Not reported	2	.1	2	.1	.....	.....

* Dwelling means place in which family lived during greater part of year following baby's birth, or, in case of stillborn child, where mother spent greater part of her pregnancy period.

ROOM CROWDING.

The number of persons per room for the families included in the study is shown in Table XXII. The infant mortality rate shows a marked increase as the number of persons per room increases. Among the families visited were found 50 cases of foreign boarding homes sheltering more than 10 persons where there were 2 or more persons per room, and 20 where there were 3 or more persons per room. In one instance 20 lodgers in addition to the family were living in 5 rooms; in another 17 lodgers, day and night shifts, were housed in a single basement room. Some rooming houses kept by native Americans were badly overcrowded also.

Room crowding was definitely covered by the housing code which specified the amount of air space per person (sec. 430), but this provision, difficult of enforcement under any conditions, was entirely inoperative with so inadequate an inspection service as Akron supported. The building inspector took up extreme cases of crowding that were brought to his notice from outside sources; he said that he was able to enforce better conditions temporarily, but there was no way of preventing a return of previous conditions.

Some house crowding was probably due to high rental and the scarcity of houses. These factors undoubtedly increased the tendency to subdivide houses and force families to get along with fewer rooms than they needed. But the greatest amount of serious overcrowding occurred in the houses inhabited by the foreign born,

among whom it is customary to use all available space for lodgers in order to add to the family income. In this particular the infant mortality investigation gave but little indication as to the extent of such crowding because many of these boarding houses, especially the largest and most crowded, did not harbor small children. In two foreign tenement houses the preliminary canvass showed 149 persons living in 15 four-room tenements. Some of these families used their cellars as kitchens, but even allowing for this there were 149 persons in from 60 to 70 rooms, or more than 2 per room in the two houses. Most of these tenements were either subdivided for two families or used as boarding houses.

TABLE XXII.—*Live births during selected year, infant deaths, and infant mortality rates, according to number of persons per room.*

Persons per room. ^a	Live births.	Infant deaths.	Infant mortality rate. ^b
Total.....	2,253	193	85.7
Less than 1.....	1,362	75	55.1
1 but less than 2.....	707	89	125.9
2 but less than 3.....	141	24	170.2
3 but less than 5.....	39	5	
Not reported.....	4		

^a Excluding infant born during selected year.

^b Not shown where base is less than 100.

CIVIC FACTORS.

BIRTH AND DEATH REGISTRATION.

The fundamental prerequisite to an effective program for reducing infant mortality is complete birth and death registration. Without complete registration the community does not know whether its infant mortality rate is high or low, whether measures for the safeguarding of infant lives are urgent, and whether measures adopted are effective. With the information as to causes of death the community can arrange a program suitable for its problems; the complete list of births is needed in order to take measures to safeguard infants' eyes, and to distribute educational leaflets and pamphlets containing instructions for the mother. From the infant mortality rates based on births and deaths, the community can determine the condition of its infant population and measure its progress.

Birth registration.

The Ohio State law (sec. 1910, revised in sec. 218, 1913) requires births to be "immediately registered in the district in which it occurs"; within 10 days after the birth the physician or midwife in attendance must file with the local registrar a certificate of birth. A heavy penalty is imposed for the violation of this law and no fee is paid to physicians for the filing of such certificates.

The original law of 1910 contained a provision requiring the physician or midwife in attendance to furnish and certify all the items required in the standard birth certificate approved by the United States Bureau of the Census. These sections of the law were held unconstitutional, as exceeding the police power of the State. The law was then revised; under the present law no penalty is imposed on physician or midwife for failure to report certain of the items—in general those relating to father or mother—provided that a certificate is filed to the effect that it would be difficult to secure this information without a special inquiry. In such cases, it is the duty of the registrar to secure such information. This amended law went into effect on July 25, 1913; hence for almost one month of the year under study there was no effective legal provision for enforcing birth registration.

In his annual report for 1913 the Ohio State Registrar wrote:

The registration of births in Ohio for 1913 shows quite a marked improvement over 1912, but it does not yet show sufficient completeness. * * * Since the amended law became effective, it has been the aim of the bureau to put the birth registration again upon its feet; but it is a more difficult task to rejuvenate an old system than to establish an entirely new one. The great majority of the physicians and midwives of the State are reporting births promptly. Some, during the time for which no law was in operation, became negligent in the matter of reporting; and while there is no disposition upon their part to evade the law, they have gotten out of the custom of making reports. There have been a sufficient number in this class to make the registration incomplete.¹⁰

Of the births in the detailed study, one-seventh had been unregistered. Midwives were but slightly more negligent in registration than physicians, 14 per cent of midwife cases and 12 per cent of physician's cases having been unregistered.¹¹ The presence of a large number of foreign-born mothers who were unable to speak English, and who may have been unaware of the law requiring births to be registered, was not alone responsible for the incomplete registration; for, although one out of every seven births to foreign mothers was unregistered, one out of every eight births to native mothers was unregistered.

Death registration.¹²

Failures to register deaths were also found. Of the 193 infant deaths occurring in the group studied, 7, or 3.6 per cent, had not been registered. Though the proportion thus found to be unregistered was not so large as the omissions of births, it implied a much more serious criticism of local registration, since it should be comparatively easy to enforce the requirement of death registration in connection with burial permits.

¹⁰ Annual Report, Bureau of Vital Statistics, Ohio, 1913, p. 6.

¹¹ Both physician and midwife attended 23 births, 3 (13.1 per cent) of which were not registered.

¹² Statements as to completeness of registration refer to the time of the study.

HOSPITAL WORK.

Before March, 1915, Akron had but one general hospital—the City Hospital—a private corporation supported by fees and donations. Its capacity was 110 beds, but it had been for several years inadequate for the needs of the community. After the Children's Hospital was opened in 1911, the City Hospital refused to admit patients under 12 years of age. No free beds were provided. Persons needing hospital care and unable to pay for it were admitted through the charity organization society and for their care the city paid a nominal sum. Comparatively little maternity work was done—in 1914, 320 cases were delivered—probably due to the lack of room and proper equipment for obstetrical work. The hospital made no provision for prenatal care and up to August, 1915, did no social work in the homes.

In March, 1915, the People's Hospital was opened under private auspices and for a while helped to relieve the congestion in the City Hospital, but again no adequate provision was made for persons unable to pay for hospital treatment.

The Children's Hospital had grown out of the Mary Day Nursery, which made over a part of its plant into a hospital in 1911. It took children under 12 years of age as patients, except those suffering from contagious diseases. The hospital was small and the maximum number of patients which could be accommodated was 55. The regular charge was \$1 per day, but treatment was given free to all who were in need. Until September, 1915, the hospital had received from the city an annual appropriation of \$2,500, but at that time the amount of appropriation was changed to a pro rata basis.

NURSING WORK.

The Visiting Nurse Association had nine nurses; four did school and playground work and were paid by the board of education, one specialized on tuberculosis cases and was paid by the Summit County Health Protective Society from a fund secured by the sale of Red Cross Christmas seals, one specialized on eye cases and the other three did general nursing. The "eye" nurse devoted her whole time to treating eye cases, giving instructions about their care, and taking to doctors children whose eyes were affected. She kept in touch with the midwives in the city, and saw that they were supplied with nitrate of silver. In 1914 the Visiting Nurse Association started a milk station from which milk was dispensed for needy patients and babies. The babies' milk was either modified at the station or mothers were taught how to modify it in their homes. Leaflets giving instructions on the care of the baby were distributed. These were printed in Magyar, Italian, German, and English. Care of infants formed only a small part of the association's work and was

confined practically to the care of babies in families where the nurse had adult patients; the number in 1915 did not exceed 35 at any one time.

Three nurses were employed by the city in the contagious disease hospital under the board of health.

These 12 nurses, 9 of the Visiting Nurse Association, and 3 of the board of health, constituted the staff of public-health nurses available in 1914 for Akron with its population of approximately 100,000. There was a noticeable increase in the nursing work in Akron in 1917 and 1918 in connection with the reorganization of the health department.

DAY NURSERY.

The Mary Day Nursery—the only day nursery in the city—was incorporated in 1891. In 1911, as already mentioned, a part of the plant, which was too large for the day-nursery needs of the city, was made over into the Children's Hospital. During the year ended June, 1914, the nursery took care of 139 children representing 93 families, more than one-half of which were reported as American.

At the time of the study there were no dispensaries or other medical relief agencies in Akron.

THE BOARD OF HEALTH.

The powers of the board of health are defined in the General Code of Ohio, 1910. The board is intrusted with the general care of the public health and may make such regulations as it deems necessary for the prevention and restriction of disease; and for the prevention, abatement, or suppression of nuisances. It is also empowered to appoint sanitary police and inspectors of dairies, slaughterhouses, shops, etc.

The organization of the Akron health department in 1915 was as follows:

The board of health consisted of five members appointed by the mayor, without salary, for a term of five years; the mayor was president ex officio. The board had the following officers and inspectors:

Health officer (part time) ¹³	\$1,200
Dairy and food inspector.....	1,500
Dog catcher.....	1,020
Two sanitary police.....	900
Three nurses for contagious disease hospital.....	900
	840
	720
Clerk and registrar ¹⁴	720
City chemist.....	(¹⁵)

¹³ The health officer gave only a part of his time to health department work, viz, one visit a day to the contagious disease hospital, one hour a day to office work, and to consultations with physicians as called upon.

¹⁴ Plus fees from the State as registrar of vital statistics, which amount to between \$700 and \$800 a yr

¹⁵ Part of salary paid by board of health and part by service department.

Since 1913 appointments had been made under a classified civil service.

The work of the health department covered the control of contagious diseases and sanitary and food inspection.

Control of contagious diseases.

This branch of its work was given the most emphasis. Physicians were required to report immediately cases of quarantinable diseases, smallpox, diphtheria, membranous croup, and scarlet fever. The clerk stated that such cases were almost always reported where a physician was in attendance. Cases of other reportable diseases, however—typhoid, measles, whooping cough, chicken pox, and tuberculosis—were often not reported. According to the annual reports of the health officer, in 1914, only 17 cases of pulmonary tuberculosis were reported, although 59 deaths occurred; this indicates an extremely defective case registration. One of the two sanitary police was assigned to contagious disease work, posting quarantine placards, inspecting the observance of quarantine regulations, and performing similar duties. In 1913, 66 cases of typhoid fever were reported, with 15 deaths; in 1914, 84 cases and 23 deaths.

The health department had a small contagious-disease hospital consisting of two wooden dwelling houses for the care of scarlet fever and diphtheria only; and a detention hospital or pesthouse for smallpox. Patients who were unable to pay were cared for free in these hospitals; others paid \$1 a day in the wards, or \$2.50 for a private room. As has been stated, three nurses were employed by the city in connection with this hospital for contagious disease.

The health department had also another small furnished building to which patients with erysipelas or trachoma were admitted. The patient had to provide food and attendance, because the department had no appropriation for the care of such cases.

The diagnostic work for the health department was done by the city chemist, who had his laboratory at the Municipal University of Akron. Physicians in Akron also had recourse to the State pathological laboratory for assistance of this kind. This branch of work was extremely limited and consisted largely of the examination of throat cultures for diphtheria.

Sanitary inspection.

The second of the two sanitary police in the employ of the health department was assigned to sanitary inspection and abatement of nuisances, such as those arising in connection with garbage conditions, privy vaults, stables, and chicken yards. No report was available of the work done by this officer. He stated that he had hardly time to attend to complaints coming to him and, therefore, attempted nothing except to remedy conditions of which complaint was made.

Food inspection.

The Akron Board of Health in 1911 drew up and put into effect a sanitary code covering the production, sale and care of milk, meat, fish, poultry, game, vegetables, fruits, bread, pastry, confections, ice cream, etc. This code was amended in 1911, 1912, and 1913. The enforcement of the provisions of this code for the safeguarding of all kinds of foodstuffs, including the inspection of dairies, slaughterhouses, markets, stores, etc., was in the hands of a single inspector, who received the highest salary paid in the department. The provisions in regard to milk are discussed in the next section.

Milk supply.

A most important duty of the board of health from the point of view of reducing infant mortality is the regulating of the production and sale of milk. The sanitary code provided that cows should be properly fed and housed and tuberculin tested at least once a year; that milk should be handled under sanitary conditions by persons free from contagious disease, and that it should be cooled and kept below 65° F.; and that milk sold at retail should be contained in closed bottles and should reach certain chemical and bacteriological standards; pasteurization was required. All persons bringing milk into the city of Akron for sale were required to hold a permit issued by the board of health on the recommendation of the sanitary inspector, and permits were to be renewed annually in January and revoked if conditions fell below standard. There was, however, lack of proper provision for regular dairy inspection.

As has been seen, the enforcement of the sanitary code regulating the production, sale, and care of milk, meat, fish, poultry, game, vegetables, fruits, bread, pastry, confections, ice cream, etc., as well as the handling of all cases of real or suspected hydrophobia, was in the hands of a single inspector. He had no adequate laboratory, no means of conveyance, and no assistant, not even for clerical work. The inspector stated that he was frequently unable to make inspections for months after requests from dairymen for permits to sell milk had been received, and consequently he had granted permits and made inspections later. Since the results of inspection were not published, the inspection work was of little value to the individual proprietors or to the public. The inspector required no proof that cows were tested with tuberculin because he feared that if this provision were enforced dairymen would send their milk to near-by towns where no such requirements were made. After the first inspection the dairies and premises of licensed milk dealers were not usually inspected further unless a complaint was made. No score cards were required. Infrequently, perhaps once a year the food inspector tested milk for temperature, and enforced

law by dumping all milk found to be above 65° F. Twice a year, spring and fall, samples of milk were taken from dealers and analyzed by the city chemist. No bacteriological analyses were made.¹⁶

No records were found of any recent prosecutions for violations of the milk provisions of the sanitary code.

More than half the milk was retailed at 7 cents per quart, and the two dairies which provided milk—especially suited to babies—at 10 or 12 cents a quart served a very restricted area.

Vital statistics.

The registration of vital statistics in Akron was in the hands of a registrar on the staff of the board of health. This subject so far as it concerns birth and death registration has already been discussed.¹⁷

Expenditures.

From 1909 to 1913 the expenditures¹⁸ of the health department were as follows:

1909.....	\$5,981.71
1910.....	8,152.75
1911.....	8,896.88
1912.....	16,430.00
1913.....	16,054.00
1914.....	14,997.00

The amount shows some increase during this period, but the sums expended in 1913 and 1914 by the health department, though over twice the expenditure in 1909, were small for a city the size of Akron, especially in view of the fact that nearly half the budget went for the support of the contagious-disease hospital. The committee on activities of municipal health departments of the American Public Health Association has set the minimum per capita appropriation required for a city health department at 50 cents.¹⁹ The per capita expenditure for public health in Akron during 1913 was less than 13 cents.

In emergencies, such as epidemics or threatened epidemics, the board of health may take steps to combat them; the State General Code requires that the council pass the necessary appropriations to cover expenses so incurred (sec. 4451).

¹⁶ In September, 1915, the newspapers announced weeks ahead that chemical tests of milk were to be made. The food inspector was asked to have bacteriological analyses of a few of these samples made. Nine analyses were made—all nine were above the minimum requirement of 3 per cent butter fats, some being as high as 5.5 per cent; eight of the nine fell within the 500,000 bacteria maximum limit. One sample gave a count of 1,000,000 bacteria per cubic centimeter. The sample giving the lowest bacterial count represented one of the largest dealers, who pasteurized the milk and had a well-equipped laboratory with a chemist and a bacteriologist.

¹⁷ See p. 50.

¹⁸ The expenditures for the years 1909, 1910, and 1911 are taken from Financial Report, Akron, 1913, p. 50; and for the years 1912, 1913, and 1914 from Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research, p. 7. Akron, 1918.

¹⁹ MacNutt: Manual for Health Officers, p. 96.

Reorganization of health work.

Since the period covered by this study the Akron health department has undergone a complete reorganization and now has greatly broadened functions and increased usefulness to the city.²⁰

A full-time health officer has been employed since 1916; also a full-time epidemiologist and a full-time bacteriologist. A trained public-health nurse was secured to organize a child-welfare department which later was merged in the division of public-health nursing. By 1917 the health department's appropriation, which in 1914 had been \$14,462, had increased to \$40,000—an amount which was supplemented by private donations of about \$25,000; the budget for 1918 was \$80,000. Its per capita expenditure increased from 15 cents in 1914 to an estimated 43 cents in 1917.²¹ The department has been organized with divisions of public-health nursing, communicable diseases, sanitation, dairy and food control, laboratories, vital statistics, and education.

Recognizing the great importance of infant and child conservation in a public-health program, the health department has devoted a considerable proportion of its resources to this work. In 1916 the expenditure for the division of child welfare was \$6,094; in 1917, \$27,453.²² However, the division carried on other nursing work besides that for babies and children.

In 1916 the division took over the work of the George T. Perkins Visiting Nurse Association. In 1917 the number of nurses employed varied between 10 and 15. Three infant-welfare stations were established with the registration of 357 new babies. Together with children previously under supervision this made 1,634 infants under care. A beginning was made in prenatal work, for 65 mothers were under supervision.²³ This work for babies and mothers was still further increased in 1918. The staff of the division, the name of which was changed to the division of public-health nursing, averaged 14 field nurses, 2 supervising field nurses, and the director of the division on the regular city pay roll, and 4 nurses for tuberculosis work on the Red Cross pay roll. The number of infant-welfare stations was increased to four and 887 new babies were registered. Prenatal work was increased; 443 mothers were under supervision during that year. The station nurses also gave after-care to maternity cases.²⁴ An important addition to the work was made in that year, when the care

²⁰ Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research. Akron, 1918.

²¹ Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research, p. 7. Akron, 1918.

²² Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research, p. 7. Akron, 1918.

²³ Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research, pp. 37-38. Akron, 1918.

²⁴ Health Work in Akron, a summary of six years' work, 1912 to 1917, together with Annual Report for 1918, Bureau of Municipal Research, p. 16. Akron, 1918.

of children 2 to 6 years of age was included in the work of the stations and nurses; 464 children of this age were cared for in 1918.

The division of communicable diseases also has made great gains since the period of this study. A more satisfactory reporting of communicable diseases has developed, and in spite of better reporting a lower incidence of disease was noted in 1918 than in 1917 for mumps, poliomyelitis, measles, erysipelas, cerebrospinal meningitis, diphtheria, and trachoma. Since July 1, 1918, venereal diseases have been reportable by State law; clinics have been held three times a week and the smallpox hospital has been used for syphilitic patients. The division has also developed educational activities, including weekly reports sent to all physicians advising them of the disease situation and of recent rulings of the State health department.

The division of sanitation has made a number of sanitary surveys of certain sections of the city, covering housing conditions, water supply, flushing, sewer connections, disposal of garbage and rubbish, stables, and disposal of manure; these surveys should be helpful as a basis for improved sanitation throughout the city.

The division of dairy and food inspection during 1918 made 2,722 inspections of various sorts in spite of having been handicapped during the later months by the influenza epidemic. Of the total inspections, 62 were of dairies, 56 of milk depots, 105 of milk wagons, and 40 of pasteurizing plants. At the end of the year the health officer reported that 89 per cent of the milk supply of the city was passing through the process of pasteurization and stated as his opinion that pasteurization should be made compulsory by law for all milk sold in the city that showed a bacteria count, in samples taken from a wagon, of more than 100,000 bacteria per cubic centimeter. The health officer stated in his report for 1918 that the demand for service made upon the food and dairy division was far greater than could be satisfied by the present employees.

Over 11,000 bacteriological examinations were made in 1918 by the division of laboratories, and the city chemist made 1,163 analyses. During that year, however, only 25 milk examinations were made by the division of laboratories and only 93 milk analyses by the city chemist.

The greatly improved facilities of the city health department, since the period covered by the Children's Bureau study, for supervising the city health and sanitation may be expected to play an important part in reducing the city's infant morbidity and mortality.

SANITATION.

Water supply.

The public water supply of the city of Akron during the period covered by this study and until the end of August, 1915, was drawn from Summit Lake in the southwestern corner of the city. This

supply, with its appurtenant distribution system, was developed by a private corporation and was taken over by the city by purchase in 1912.

Summit Lake is fed partly from springs within its own area; at its southern end it receives water from both the Ohio Canal and Falor Creek. There is very little flow in the Ohio Canal; the water is polluted with factory wastes.²⁸ Falor Creek drains a considerable area of inhabited territory in the southeastern part of the city, receiving factory wastes from two large manufacturing establishments. Summit Lake itself is entirely surrounded by inhabited territory. Nearly all this territory was sewered; but on the western side of the lake house waste pipes drained into the lake; and privies, which were to be found north, west, and south of the lake, might have caused contamination of the surface drainage.

The raw Summit Lake water was generally recognized to be unsafe. Although treated with hypochlorite of lime at the waterworks, prior to 1915, the city water was not considered fit for drinking and was hardly ever used for that purpose.

Besides being contaminated, the Summit Lake water was very hard and was frequently muddy or discolored and sometimes offensive in odor. Moreover, it was insufficient in quantity; often it was inadequate for the fire service, and not infrequently the domestic supply in the higher parts of the city had to be cut off. The daily average pumped during 1914 was 10,226,240 gallons.

Plans had been developed for taking water from the Cuyahoga River, and by the end of August, 1915, work was practically completed on the new plant and the water turned into the city mains. The capacity of the plant was 20,000,000 gallons a day; this could be increased when necessary. Bacteriological tests proved the water to be safe for drinking purposes.

On November 1, 1915, the city had approximately 176 miles of water mains. Using the city engineer's office estimate of 210 miles of streets, 84 per cent of the streets of the city had water mains by the close of 1915. The waterworks department had no figures or estimates of the number of houses connected with the water supply. On January 1, 1915, the active service, including all business and factory as well as domestic connections, numbered 14,600 and on December 1, 1915, 16,300. They indicate, however, an increase during 11 months of nearly 12 per cent in the number of water connections; and a considerable part of this increase may be attributed to appreciation of the improved quality of the water supply. In the infant mortality study 70 per cent of the houses scheduled had city water.

²⁸ Previous to January, 1914, there was much trouble with seepage into the canal from one of the salt works.

As has been explained, prior to September, 1915, practically no one in Akron drank city water. This situation necessitated some kind of supplementary supply in almost every household.

Many springs on the various hills in and around Akron were thought to give good water. Water from these springs was extensively used for drinking by the people in their immediate neighborhood; a few houses had spring water piped to them; and a great many families bought spring water from various companies which delivered it by wagon. The city chemist's report for 1914 stated that he had examined 64 samples of water from such venders, of which 50 were satisfactory and 14 were condemned. During that year one spring-water company was compelled to secure a new and uncontaminated source of supply, and a second went out of business on account of pressure from the health department.

Well water, however, was most commonly used for drinking. Both dug and drilled or driven wells were used—drilled wells much the more commonly. In most localities it was not necessary to go very deep (not over 75 feet) to reach water-bearing rocks. In the great majority of cases more than one family used a well. The owners of the well charged a small sum, usually from 15 cents to 25 cents a month, for the privilege of drawing water.

No investigation of the well situation as a whole had ever been made; no one knew exactly how many wells there were, nor what proportion of them was contaminated. The city chemist examined well water only on complaint—that is to say, he tested the water only from wells that were for some reason reported to him as suspected.²⁶ The chemist's monthly reports for 1914 gave 29 wells condemned and 21 satisfactory; for 1915 (11 months) 34 condemned and 19 satisfactory. This, of course, gives no indication of the general situation. Wells which were condemned were usually merely placarded with a notice that the water should not be used for drinking without being boiled.²⁷

The city chemist stated that as a general proposition wells less than 30 feet deep were unsafe, because the ground water was heavily polluted. Besides the usual contamination found in any thickly settled area, the leakage from the Akron sewers was unusually great.²⁸ The flood in the spring of 1913 damaged greatly the sewer system, and a broken sewer caused a number of cases of typhoid before the break was discovered. Throughout the poorer districts of the city wells were often found in close proximity to privies (see Pl. II).

²⁶ Such tests were made on report either from a physician or from a citizen, provided reasonable ground for suspicion was shown. Wells were tested whenever a physician reported them as a probable source of typhoid infection; wells also in the vicinity of one that was found to be contaminated were tested.

²⁷ The health officers planned to make a survey of all the wells in the city during 1916 and to condemn and close up all that were found polluted. The survey was started, and many wells examined, after which a great many were closed. The survey was never completed.

²⁸ See Report of Ohio State Board of Health, 1913, p. 411.



PLATE I.—PRIVIES AND CHICKEN COOPS ON BANK OF RIVER. FAMILY A LITTLE FARTHER DOWN USES RIVER WATER FOR WASHING.



PLATE II.—WELL AND VAULT PRIVY.



PLATE III.—TWELVE TENEMENTS.



PLATE IV.—TOILET FACILITIES FOR ABOVE.



PLATE V.—VIEWS OF OPEN SEWER AND OVERFLOW FROM SAME.



PLATE VI.—UNPAVED STREET ALWAYS WET.



PLATE VII.—STREET BADLY WASHED OUT.



PLATE VIII.—A TYPICALLY GOOD STREET.



PLATE IX.—A DUMP.



PLATE X.—PUMP AND GARBAGE VAULT.

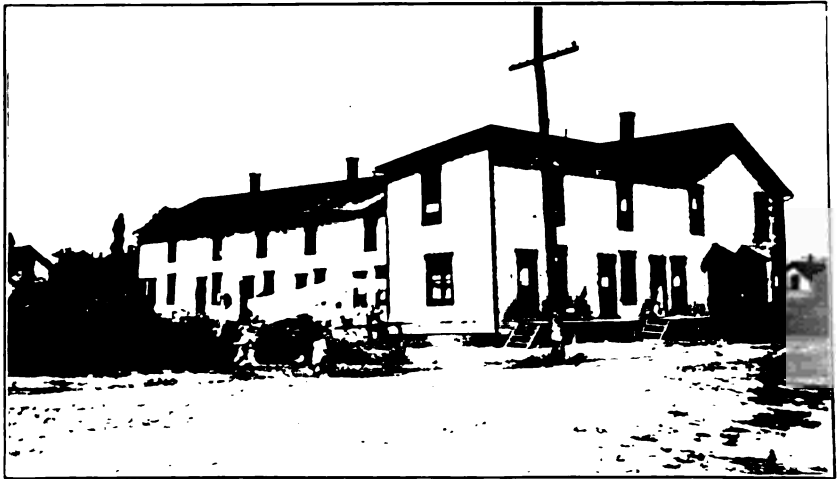


PLATE XI.—TENEMENT HOUSES.



PLATE XII.—REAR HOUSE.



PLATE XIII.—SHACKS.



PLATE XIV.—ALLEY FIVE HOUSES DEEP FROM STREET.



PLATE XV.—BLOCK CROWDING (NO SEWERS; BAD YARD DRAINAGE).



PLATE XVI.—PRIVIES, SHEDS, REAR HOUSE ON BANK.



PLATE XVII.—LOT CROWDING (2 HOUSES 19 INCHES APART). STEAM FROM CANAL JUST NORTH OF A FACTORY.



PLATE XVIII.—ATTRACTIVE GARDENS IN SMALL SPACES.



PLATE XIX.—COTTAGE IN THE OUTSKIRTS.

Although many of these privies were sewer connected, there was no assurance of water-tight connections, and the seepage from these might cause contamination.

Drilled wells going down to the "rock water"—usually 50 to 60 feet deep—were generally safe, according to the city chemist. An important exception was in the neighborhood of the depression running through the center of the city, where what is known as a "filter gallery," or trough where surface drainage settled, existed; in this section wells 100 feet deep were often found to be polluted from distant sources of contamination. Occasionally, too, ground water seeping into drilled wells caused trouble.

Filtered cistern water was commonly used for drinking in certain parts of the city, notably on North Hill. Whether or not such water was safe depended entirely on the construction of the individual cistern and whether the ground water was effectively excluded. Since the study was made city water mains have been extended to this district.

Sewerage system and sewage disposal.

According to the city engineer's office, 130 miles of sewers²⁹ had been laid at the close of 1914, and approximately 10 miles more were constructed in 1915. At the close of 1915, out of an estimated total of 210 miles of streets, 140 miles, or 67 per cent, were sewered. The construction of sewers had lagged behind the laying of water mains. The service department had no figures of the number or proportion of houses connected with the city sewers. About three-fourths of the houses scheduled in the infant mortality investigation had sewer connections of some kind, a somewhat higher proportion than had the city water.

The sewer system was partly on the combined storm water and sanitary sewage plan and partly on the separate plan. The first trunk sewer, installed in 1880, was the only one regularly receiving both storm water and sanitary sewage. This drained most of the central portion of the city. The other trunk sewers were not intended to receive storm water, but as a matter of fact many roof drains had been connected with the sewers in all parts of the city, though no more such connections were to be allowed. Furthermore, according to the engineering department of the State board of health, "The sanitary sewers are for the most part poorly constructed with leaky joints which during wet weather admit large quantities of ground water." The combination of the two classes of sewage has two disadvantages: (1) During severe storms it overtaxes and sometimes wrecks the sewers; and (2) it needlessly increases the volume of sewage to be handled by a disposal plant.

²⁹ The State sanitary engineer's estimate in June, 1913, was 100 miles.

Outside the Central District, water from the streets was discharged from the catchment basins into separate storm sewers, which emptied into the nearest natural drainage—creek or canal. Catchment basins were as a rule located only at the low points along a street; and many of the paved streets became almost impassible during a heavy rainstorm.

The sanitary sewer system was badly weakened all over the city by the flood of March, 1913. A number of sewers were more or less seriously broken; repairs on the worst damaged one—the East Akron trunk sewer, which followed the general course of the Little Cuyahoga River from near the southeastern city limits—were commenced, and \$30,000 expended; but the work had not been completed. As a result of the break, sewage was discharged into an open street from the caved-in sewer and spread out over the flat ground between the street and the river in a most offensive pool. In another case, a troublesome break caused sewage to “back” into cellars and to flow into the street; it was not repaired for more than a year.

One of the trunk sewers in the eastern part of the city³⁰ discharged into the Little Cuyahoga River under a large bridge. The outlet was some 2 feet above the level of the river at normal times; the odor arising was extremely unpleasant and persisted far down the stream. The main outfall sewer for the whole system was an oval brick conduit about 3 by 5 feet in diameter, and about 1,500 feet in length. It extended to a point known as Lock 16 where the bulk of the sanitary sewage of the city was discharged into the river. This point was well within the inhabited portion of the city—the north bank of the river, especially, having a number of dwellings opposite and just below the sewer outlet. Until the summer of 1915 a small sewer from the north bank also discharged into the river at this point. Previous to the 1913 flood, the city had constructed a 2-mile extension sewer of reinforced concrete—5 feet in diameter—from Lock 16, where the old sewer discharged, to Lock 20 beyond the city limits but had never connected this new conduit with the old one. The new sewer was badly broken by the flood and had to be repaired. Repairing was done in the summer of 1915 and the connection made in September, 1916.

The Little Cuyahoga River received considerable pollution all along its course (see Pl. I) through the city, but nevertheless appeared comparatively clean through the western part of the city. Below that point, in addition to the sewage of the whole city, it received the waters of the Ohio Canal and the Hydraulic Canal, which were highly polluted with industrial wastes. The engineer of

³⁰ Theoretically the Howard Street sewer entered the outfall sewer parallel to the river at this point, and only storm water should have been discharged under the bridge. But the discharge of sewage as above described continued throughout the time of this investigation.

the State board of health, in connection with a complaint from the Board of Commissioners of Summit County against the city of Akron, stated that—

The minimum dry weather flow [of the Little Cuyahoga River] is estimated at 5 second-feet. According to accepted standards this is sufficient to dilute the sewage of somewhat more than 1,000 persons. It will readily be seen that during dry weather the flow of the stream is totally insufficient to dilute the sewage from the city. * * * The nuisance created is not only a cause for deterioration of the property value but has also given rise to unhealthful conditions.

A sewage disposal plant had been under consideration by the city from the summer of 1910 when plans were made and land purchased near the junction of the Little Cuyahoga and Cuyahoga Rivers north of the city limits. A preliminary testing station was constructed and the 2-mile extension already mentioned of the trunk sewer to the site of the proposed plant was undertaken.³¹

In the spring of 1913, preliminary plans for the disposal plant were submitted to and approved by the State board of health. In connection with the complaint of the commissioners of Summit County, already mentioned, the State board of health ordered that the installation of the sewage disposal plant be completed by June, 1915. The necessary bond issue was authorized in April, 1914; contracts were let and work was begun in the summer of that year; the plant was completed and put into operation in the autumn of 1916.

Street paving and cleaning.

According to the statement of the city engineer's office (December, 1915), there were 104½ miles of paved streets in Akron. This was approximately one-half of the total street mileage (210) as estimated by the same office.³² Practically all this pavement was hard surface—brick, stone block, concrete, or asphalt; over 90 per cent was brick. From a sanitary point of view, this makes an excellent surface while new; but as laid in Akron it became uneven within a few years and made cleaning difficult. This deterioration of the pavement was found particularly on the main streets where traffic was heavy. However, much of the brick pavement was new.

The practice of the service department was to do practically nothing with a street until it was ready to put down a hard-surface pavement. The unpaved streets were as a rule ungraded and without gutters or drainage, and, therefore, often held water in the low spots or were badly washed on the slopes (see Pls. VI–VIII). Many of the unimproved streets were in thickly settled parts of the city, as, for

³¹ Report of the State Board of Health, 1913, p. 610.

³² The city engineer's report for 1914 gave higher figures, viz, 116.45 miles of paved streets out of a total of 178.77 miles, or about two-thirds. This figure for pavements was undoubtedly too high, as was indicated by the reduction in the later estimate. On the other hand, the Bureau of Municipal Research, in its investigation of street cleaning in 1915, had all the paved streets measured, and found only 87 miles.

example, the two shown in the photographs. Where the soil was clay, these unpaved streets were almost impassible in wet weather. On the few macadamized streets, the surface was old and badly worn; these streets were being repaved with brick as rapidly as possible. Few of the alleys were paved.

The hard-surfaced streets were supposed to be cleaned from one to six times a week. Except for the center of town, the cleaning season did not last the whole year; in 1914 it lasted seven months (Apr. 1 to Oct. 30); in 1915 only six months (Apr. 20 to Oct. 20). The streets were thus left uncleaned for a considerable part of the year. During the winter of 1914-15, the charity organization society and city relief department set their beneficiaries to work cleaning streets; for the service department had no money for such work during the winter even in the center of the city.

During the summer of 1913 and 1915, the streets were cleaned by contract, the work being let in small jobs to different contractors (in 1915, to 31 different men). In 1914 the work was done directly by the service department using street flushers on the down-town streets; in 1915, however, the work was done exclusively under contract by hand sweeping, the council refusing to provide money for the use of the department's flushing machines on the streets. Since 1915 the city service department has cleaned all streets, and no more contracts have been let.

At the time of the study the service department had one inspector whose duties were to inspect pavements and sewers laid, to investigate complaints, and to inspect street cleaning. Since the study the department has been entirely reorganized, and Akron now has 40 inspectors for paving and street cleaning.

Refuse and garbage disposal.

Up to and including the period of the infant mortality investigation, and throughout 1915, Akron had no public provision of any kind for the collection or disposal of refuse or garbage.

Refuse not privately disposed of was ordinarily thrown on dumps, of which there were a number—more or less officially recognized—in different parts of the city. All were in places where the property owners wished to fill in low land, and the miscellaneous rubbish deposited was used for the under layers of the fill. Some of these dumps were in thickly settled parts of the city, and in close proximity to dwelling houses. In one place on the northern slope of North Hill an attractive wooded ravine had been spoiled by allowing refuse to be dumped along its sides. Depositing or dumping garbage or material that would decay was prohibited by city ordinance. The board of health posted notices to that effect but did nothing to enforce the prohibition. In one instance the

property owner kept a watchman at the dump to see that objectionable material was not deposited.

As a matter of fact, more or less garbage was left at the dumps, many of which were malodorous throughout the summer, and all of which swarmed with flies. In many places in the poorest parts of the city, it was customary to throw refuse and garbage into back yards and vacant lots, over canal and railroad banks, and sometimes even into the streets, practically forming miniature dumps.

The common method of garbage collection was by private contract. The usual charge for this service was from 15 cents to 25 cents a week, usually for two collections. The health department had no authority over garbage collectors, unless they created a nuisance by spilling garbage on to the streets. Anyone who wished could enter the business, and each collector disposed of his collections as he saw fit. One company did the great bulk of the business; this company maintained a large garbage dump about 2 miles outside the city, where the garbage collected by its wagons was burned or fed to swine.

One great disadvantage of such commercial garbage collection was that the collectors would not go where they could not secure enough patrons to make it pay, and consequently many families who would have liked to have had their garbage removed could find no one to do it.

A city garbage disposal plant had been under discussion for a number of years. During the summer of 1914 a contract for the garbage plant was let, at about the same time as that for the sewage purification works. Both plants are located on the same tract of land, 2 miles down the river from the city. The garbage plant was completed in January, 1916. Garbage collection has recently (1919) been taken over by the bureau of sanitation of the city service department, which has exclusive control; private collection is no longer permitted.

SUMMARY AND CONCLUSIONS.

Akron is an industrial city in the Middle West with a large proportion of foreign born. The rubber industry predominates, and wages are relatively high.

INFANT MORTALITY RATE.

One hundred and ninety-three out of 2,253 infants born alive in the year selected for study died during the first year of life, giving an infant mortality rate of 85.7 per thousand live births. The still-birth rate was 3 per cent of the total births. Of the cities studied by the bureau Akron had next to the lowest rate of infant mortality, a rate which was in marked contrast to the high rates of Manchester, Johnstown, New Bedford, and Waterbury. Though, as contrasted with other cities studied by the bureau, Akron rates were low, the experience of certain cities of the United States and other countries shows that even these low rates may be very materially reduced.

NATIONALITY.

Of the total births, 39.4 per cent were to foreign-born mothers. The mortality rate for infants of foreign-born mothers was considerably higher than that for infants of native mothers, 109.3, as contrasted with 70.1. Among the foreign-born mothers the highest rate was found for the Slavic group, 146.6; the rate for infants of Italian mothers was 116.4, while the German had an infant mortality rate of 105; the rate for Magyars was 102.8.

ATTENDANT AT BIRTH.

Approximately three-fourths of the births in Akron were attended by physicians. Midwives were sole attendants in 505 cases, or 22 per cent of the total. Four hundred and seventy-eight of these were births to foreign-born mothers.

TYPE OF FEEDING.

One hundred and sixty-three infants were artificially fed from birth. The proportion of infants of native mothers who were artificially fed is slightly higher at all ages than for other groups. Among the different foreign nationalities the Italian and Slavic mothers had the lowest percentages of infants artificially fed. The mortality among artificially fed babies was on the average more than four times that among breast-fed babies.

EARNINGS OF FATHER.

In the lowest earnings group, under \$450, the infant mortality rate was 117.1, while in the group \$1,250 and over the rate was only 40. As the earnings of the father increased the infant mortality rate diminished. As compared with other cities studied by the bureau a much larger proportion of families was in the higher wage groups—a fact which may in part explain the low general infant mortality. In Akron 13.2 per cent of the births were in the group over \$1,250, as contrasted with 6.5, 6.4, and 8.7 in New Bedford, Manchester, and Waterbury, respectively.

GAINFUL EMPLOYMENT OF MOTHER.

A comparatively small proportion of mothers were gainfully employed. About one-fourth were gainfully employed during the year preceding the birth of their babies, but only 175, or 7.5 per cent, worked away from home. The mortality among infants whose mothers were gainfully employed during pregnancy was higher than for infants of mothers not gainfully employed, 107.4, contrasted with 77.2. For gainful employment of the mother after the birth of the infant, the numbers were too small to be significant.

BIRTH REGISTRATION.

Both birth and death registration could have been improved. The house-to-house canvass made in Akron showed that at least from 10 to 14 per cent of the births during the year selected failed to be registered. Of the deaths in infancy, 3 per cent were not registered.

CAUSE OF DEATH.

The largest number of deaths was due to diseases of early infancy, followed by gastric and intestinal diseases and respiratory diseases. The mortality rate from gastric and intestinal diseases among infants of foreign-born mothers was almost four times as high as that among infants of native mothers. The rate was especially high in the Slavic group. A large proportion of the babies who died from these diseases were artificially fed.

PRENATAL CARE.

The reorganized health department of Akron has made a beginning in the prevention of stillbirths and of infant mortality from diseases of early infancy through the prenatal supervision and after care of maternity cases already undertaken. In view of the relatively large proportion of deaths of babies in the early weeks of life, this work is shown to be very important, and should be so increased that adequate prenatal and obstetrical care would be available for all mothers in the city.

INFANT-WELFARE WORK.

Through infant-welfare stations and the instructive work of nurses in the homes, the infant death rate from gastric and intestinal diseases, and—to a less extent—that from respiratory diseases, may be lowered. The four stations already established by the health department will undoubtedly accomplish much to this end, but the number of stations and of nurses needs to be increased, as pointed out by the city health officials in their 1918 reports. The Public Health Commission of New York State recommended that "cities with an industrial population should have one infant-welfare station for approximately each 20,000 inhabitants." The increase in the number of public-health nurses working in Akron has already been a remarkable one; but a further increase is needed for the adequate health protection of its babies, mothers, and whole population. Experts have estimated that a city needs one public-health nurse for every 2,000 of its population;³³ on this basis, Akron still needs a force of nurses far in excess of that already at work.

³³ See Minimum Standards for Child Welfare, adopted by the Washington and Regional Conferences on Child Welfare, 1919, p. 7. U. S. Children's Bureau Publication No. 62. Washington, 1919.

APPENDIX.

METHOD OF PROCEDURE.

Scope of Inquiry.

In the law creating the Children's Bureau, passed by the Sixty-second Congress, infant mortality was specified first in the list of subjects to be studied. The mortality among infants under 1 year is higher than mortality at any other period of life except old age. The report of the Bureau of the Census on Mortality Statistics shows that in 1910 for every 1,000 live births registered in the death-registration States there were 124 infant deaths under 1 year of age.¹ In 1915 in the birth-registration area, including the New England States, New York, Pennsylvania, Michigan, Minnesota, and the District of Columbia, for every 1,000 live births registered there were 100 infant deaths. In these States the infant mortality rate varied from 70 to 120 for the State as a whole, while for cities in these States having in 1910 a population of 25,000 or over the range of the rates is much greater—from 54 in Brookline and Malden, Mass., to 196 in Shenandoah, Pa.

TABLE I.—*Infant mortality rates for States in the birth-registration area: 1915.^a*

State.	Infant mortality rate.	State.	Infant mortality rate.
Connecticut.....	107	New Hampshire.....	110
Maine.....	105	New York.....	99
Massachusetts.....	101	Pennsylvania.....	110
Michigan.....	86	Rhode Island.....	120
Minnesota.....	70	Vermont.....	85

^a United States Bureau of the Census, Birth Statistics, 1915, p. 10, Washington, 1917.

It is evident from these figures that conditions in some States and in some cities are much more favorable than in others. On the causes of low or high mortality the figures of the Bureau of the Census throw little light. If inquiries were made in restricted areas and information on the physical, social, economic, and civic conditions were secured for all births and for all deaths under 1 year, it would be possible to determine the underlying causes that favor a low mortality or produce a high rate.

¹ The rate is too high since the registration of births was incomplete in these States; in many of them it was very deficient. Figures are shown for the death-registration States of 1911 and are for 1910, except in Kentucky and Missouri, where births and deaths are for 1911.

With this object in view the Children's Bureau selected a number of cities that offered contrasts in economic, industrial, and social conditions in which to make intensive studies of the conditions of infant life and infant mortality. The choice of the first cities to be studied was limited for practical reasons to cities with accepted birth registration, on account of the facilities afforded by the birth records for ascertaining where the mothers to be interviewed lived. It was further necessary to choose cities of such size that they could be covered thoroughly within a reasonable time by the few agents available for the work. Certain characteristics of the cities chosen are summarized in Table II. All were manufacturing cities, the populations ranging, in 1910, from 50,000 to 100,000. All had a large foreign element. In addition, judging by the provisional figures available when the choice was determined upon, every city with the exception of Brockton had a high infant mortality rate.

TABLE II.—*Population in 1910, infant mortality rates 1910 and 1915, percentage of population over 20 foreign born, principal foreign nationality,^a and principal industry of the cities chosen for infant mortality studies.*

City.	Population in 1910.	Infant mortality rates.		Percentage of adult population over 20 foreign born, 1910.	Principal foreign nationality. ^a	Principal industry.
		1910. ^b	1915. ^c			
Johnstown, Pa.....	55,482	165	116	39.9	Varied Slavic ^d	Iron and steel.
Manchester, N. H.....	70,083	193	150	56.1	French Canadian.....	Cotton textiles.
Brockton, Mass.....	56,878	99	82	37.3	Lithuanian.....	Shoe manufacture.
Saginaw, Mich.....	50,510	145	101	33.7	German.....	Varied industries.
New Bedford, Mass.....	96,652	177	143	59.0	Portuguese.....	Cotton textiles.
Waterbury, Conn.....	73,141	149	143	50.5	Italian.....	Brass manufacture.
Akron, Ohio.....	69,067	123	.....	26.0	German.....	Rubber manufacture.

^a Principal foreign nationality of mothers of infants included in the infant mortality studies.

^b Figures published by the United States Bureau of the Census, Bulletin 109, Mortality Statistics, 1910, pp. 18-19, based on provisional figures for births. The rate for Akron, Ohio, was furnished by the Ohio State registrar. The rate for Saginaw, Mich., was based on State (final) figures for births.

^c United States Bureau of the Census, Birth Statistics, 1915, Washington, 1917.

^d No particular Slavic group of sufficient importance to mention separately.

Infant mortality rate.

An infant mortality rate expresses the probability of a live-born infant dying before his first birthday and is usually stated as the number of deaths under 1 year per 1,000 live births.² The usual approximate method of finding the infant mortality rate for a certain area is to divide the number of registered deaths of infants under 1 year of age occurring in a given calendar year by the number of registered live births in the same year. The number of deaths thus secured includes not only deaths of infants born in the same calendar year, but also some deaths of infants born in the preceding year or in a different area; it excludes deaths of infants included in the group

² Stillbirths are omitted from both births and deaths.

of births if the death occurred either in a different area or in the following calendar year. The two numbers—of deaths and births—do not refer to the same group of infants. To avoid this inaccuracy, the method employed by the Children's Bureau in all studies has been to follow each infant born in a given selected year in a certain area for a period of 12 months. The deaths among these infants are then compared to the births. In this way the deaths include no infants not included in the births, and the true probability of dying in the first year of life is secured.

The chief difficulty, in practice, in computing infant mortality rates arises from the incompleteness of registration of births and deaths. On account of differences and changes in completeness of registration it is not always safe to compare infant mortality rates in cities with those in country districts; in one State with those in another; in one city with rates in another; or even to compare rates in one year with those for preceding years in the same city. If the per cent of omission of deaths under 1 year of age is equal to the per cent of omissions of births, the infant mortality rate, though based on incomplete data, will still be correct. In general, however, death registration is better than birth registration. If birth registration is more defective than registration of infant deaths, the infant mortality rate will be too high. Inaccuracies will affect not only the general rate for a given area but may affect also the comparability of the rates for different classes within the area. In an analysis of births and deaths by race and nativity classes, if the degree of completeness of registration varies with the different classes, the rates found by dividing the deaths by the births may not be comparable. For the purpose of these investigations comparable rates are essential.

It is not of so much importance that the rate secured shall characterize general conditions of infant mortality for a given area as that rates for the different nativity classes, earnings groups, and other subclasses shall indicate the true differences for the area in the incidence of infant deaths. There are two methods of treating the original data to make them more serviceable for this purpose. One is to exclude the least accurate material, where it is known to be incomplete or inaccurate; the other is to make a selection of material on some unbiased basis and use the data selected as representative of the city. An alternative policy is so to supplement the original data that the figures used include all the evidence applicable to the groups studied in the city.

Certain groups for which the information is inaccurate or incomplete have been excluded in all the studies made by the bureau. The groups for which the rates are most open to question and most difficult to obtain are illegitimate births, births in families that have moved away, and births to nonresident mothers.

The first of the groups that have been excluded from the general analysis is the group of illegitimate births. The information secured is probably not so complete as for legitimate births; furthermore, it relates to an abnormal family group. Special studies of mortality rates for illegitimate children have been made for one or two cities, but the data can not be considered so satisfactory as those presented in the general analysis.

Births to mothers who moved away in the first year of the infant's life form the second group of exclusions. The information as to the number of deaths that occurred in this group is not complete. Obviously, if the infant moved away from the city after the first few weeks or months of life, his death, if he died, would not be registered in the city. Deaths registered in the city of infants born to mothers who later moved away also have to be excluded; otherwise the rates would be biased by the exclusion of live births only, with no exclusion of infant deaths to correspond.

A third group of exclusions is the births to nonresident mothers. These were excluded not only on the ground that in most cases the infant did not live in the city during his entire first year of life but also on the ground that the conditions under which nonresident mothers lived prior to coming to the city may be different from those of the average mother in the city. In order to make the rate as characteristic of the city as possible these births were excluded.

Births to mothers who could not be found were also excluded. In such cases the probability was that the mother had moved away. No reliable information could be secured about these cases and hence the only safe policy was to exclude them.

In practice, since the agent's visit always was made after the first anniversary of the birth of the child—in some cases a year or more afterwards—births were excluded if the mother had moved away from the city prior to the agent's visit and could not be found at this time.³

The data submitted in the report apply, therefore, to births in the city during the selected year to resident married mothers who lived there during the child's first year and were found at the time of the agent's visit.

Though the records for births to resident married mothers are much more complete and satisfactory than for all births in the city, there still remains the difficulty that differences in the completeness

³ The rulings in two special cases might be mentioned: (1) If the mother died during the child's first year, the birth was included if the infant (or, in case of death, his family) had lived in the city during the first year after his birth. (2) In a few cases mother and child were away from the city for a part only of the child's first year but later moved back and were found by the agent. In the cities first studied agents were not instructed to inquire as to continuous residence in the city. If, however, the fact that the mother had moved away for a period was noted, the birth was excluded in tabulation, if the absence from the city had been three months or more. In Akron, the birth was excluded in case of removal, a temporary absence on summer vacation not being considered a removal.

of registration for different groups may affect the comparability of rates. If all births and all infant deaths were registered, the rates for these groups would be correct. It was found, however, in examining the birth and death certificates that occasionally a death had been registered of an infant born in the city whose birth had not been recorded. Obviously, the more incomplete the birth records are the more frequently such cases would occur.

There were three possible methods of meeting this difficulty. The first was to accept these death records and treat them as if the births had been recorded. The second was to make a selection of births and include only deaths among the births selected, the obvious basis of selection being the fact of registration of birth. The third was to attempt to complete the records of births and deaths by a canvass. The first method was rejected in favor of the second and third on the ground that the inclusion of all these death records would tend to exaggerate the mortality rates.

The second method was followed in Manchester, Brockton, and New Bedford. In Brockton and New Bedford, as in other cities in Massachusetts, a special canvass is made to check up registration of births during the preceding year. Consequently, in these cities a birth might have been registered either by the physician soon after the birth or by the special canvasser on his visit. All births recorded, whether regularly registered or added by this special canvass, were treated as registered for the purposes of this study.

The third method, or a modification of it, was followed in the other cities studied. In Johnstown, Pa., the original plan was to limit the investigation to registered births in 1911. But during the progress of the investigation it was found that many births to Serbian mothers escaped registration, and it was thought that this group was too important to be omitted entirely. Accordingly, the birth records were supplemented by the baptismal records of the Serbian church, and a canvass was made of the principal Serbian quarters. Agents were instructed to take schedules for any infants found who were born in Johnstown in 1911, even if the births had not been recorded. In Saginaw the registered births were supplemented by the births secured in various ways—from death certificates, baptismal records, through neighborhood inquiries, and other sources. The agent calling on each mother inquired if there were other children in the neighborhood of about the same age. By these means 116 births to resident married mothers were added. Three unregistered deaths were added to the 113 recorded.

In Akron a house-to-house canvass was made to supplement the list of names secured from the birth register. This procedure was the more necessary since Akron was not in the birth-registration area. The canvass was undertaken not so much to complete the record of

children born in Akron during the selected year, as to complete the record of such children who lived in Akron during the first year of life. Obviously it would be more difficult to secure records for children whose mothers moved away from the city before the end of the first year of life, or for children who had died. The omission of such births from the canvass would not have affected the validity of the canvass for the purposes of this study. All the names secured either by birth records or by the canvass were used as a basis of the visits to mothers, and those cases for which the information secured showed that the child had been born in Akron in the selected year and had lived in the city during his lifetime up to the first birthday were included in the special study. Incidentally the canvass greatly facilitated the work of finding the mothers, for it gave the correct address of most of the mothers to be interviewed.

Every effort was made to secure as complete a canvass as possible. Agents were instructed to inquire for births in the city during 1913 and 1914. Since the selected year was from July 1, 1913, to June 30, 1914, information was thus obtained for births just before and just after the selected period, and thus an opportunity to check the date of registration was afforded. A bonus was given to the agents for each live birth discovered and a somewhat larger bonus for a death or stillbirth.

The thoroughness of the canvass can be tested in the following way: If the canvass had been complete, then it should have found all infants whose births were registered and who were living in Akron at the time the canvass was made. This figure would be approximately equal to the number of such children whose births were registered and who survived the first year of life, or 1,788. Of these children, the canvass failed to find 136, or 7.6 per cent. In some instances, however, the omission could be explained by temporary absence at the time of the canvass, in 3 cases by death at over 1 year of age before the canvasser arrived. Though theoretically it should be possible to secure stillbirths and deaths by the canvass method, yet in practice the canvassers were not nearly so successful in securing such records.

As a result of the canvass 309 names were added to the registered live births included in the study. These form 13.7 per cent of the total number of live births included in the study. Besides these the canvass found some 8 births in the city during the selected year which had to be excluded for various reasons. Fourteen more were added from the death records. The total number of unregistered live births found was thus 331, or 11.4 per cent of the total live births in the city. Obviously, as suggested above, owing to the difficulty of finding by a canvass births to nonresident mothers or to mothers who had removed from the city, the percentage first given is a more significant index of the percentage of births not registered.

By using records secured from these two independent sources, the canvass, and the birth and death register, a very complete list of the infants born and living in the city or who had died at less than 1 year of age was obtained. The chance of omissions both from the birth register and from the canvass list is relatively negligible, probably but 1 or 2 per cent.

Besides 309 live births added to the list of births registered, the canvass added 12 cases of stillbirths and miscarriages that occurred during the selected year.

With the general plan of the investigation determined, the more important points in the detailed procedure were as follows. The first step was to copy (from the records at the State capital) the birth certificates for the the year selected; then the death certificates for the year selected and the year following were examined, and the facts as to birth and death for infants born in the year selected were transferred to the schedules.⁴ These records usually gave the address of the mother, though not in all cases the present address. In cities where a canvass was made the actual address of the mother was found directly. If the mother had moved, the agent attempted to learn from the neighbors or other sources her present address in the city or whether she had moved away. Most of the information contained in these reports is derived from the answers secured from the mothers interviewed. Since the bureau has no power nor desire to compel answers, the information secured was based on the voluntary statements of the mothers. To the willingness of the mothers to answer all questions and to cooperate in every way is due the completeness of the records; upon this completeness the value of much of the information depends.

In comparing, then, the rates for the group included in the study with the rates for the corresponding calendar year computed in the ordinary manner, the following points must be borne in mind:

First. In rates computed by the ordinary method the deaths and births occur in the same year. In rates for the bureau studies the births in a selected year are compared to the deaths among them. The deaths are scattered over a period of two years, including the selected year and the year following.

Second. Illegitimate births are excluded from these studies.⁵ The death rate for illegitimate births is usually considerably higher than the average rate. The rates as shown in these studies, therefore, may be expected to be somewhat lower than the rates as usually computed.

Third. Births to nonresident mothers are excluded in order to make the rates as characteristic as possible of the conditions of the locality studied.

⁴ Duplicates were omitted, and erroneous registrations of births occurring outside the city were eliminated.

⁵ Except for Johnstown, where illegitimate births were included.

Fourth. Births of infants whose mothers moved away during the year following the birth and deaths that occurred in this group are excluded, because in the absence of data on age at removal it is impossible to use the figures except on the basis of arbitrary assumption. Deaths in the city of infants born elsewhere are also excluded, because there is no information on age at migration. This policy excludes, of course, infant deaths in foundling asylums, if the birth did not occur in the city.

Fifth. In some of the cities rates are based on the deaths among the registered births. Infant deaths where the birth was not recorded have therefore been omitted, to correspond with the probable omission of infants surviving the first year of life whose births were not recorded.

Finally, in other cities the birth records have been completed or supplemented by a canvass or by other means. In these cases it is easy to show from the incompleteness of the records that the rates computed in the usual way on the basis of these records are much less accurate than the rates given in these studies for the included groups.

Live births excluded in Akron.

With the foregoing explanation of the method of procedure in mind, the significance of the exclusions and the rates for the excluded groups may be more easily grasped. During the selected year there were 2,906 live births in Akron. Of these, 496 moved out of town, 129 could not be found, and 13 were births to nonresident mothers—a total of 638 which were excluded on grounds of nonresidence or lack of information. Of these 638 births, 20 were unregistered—14 were discovered through the death certificates; obviously no fair rate could be based on these cases on account of the difficulty of finding unregistered births to mothers who had moved away. Among the 618 registered live births to mothers who could not be found or had moved away, 49 deaths were known to have occurred. These deaths registered in the city probably do not include all deaths among this group. The mortality rate, therefore, of 79 is probably somewhat less than the true rate for this group. Among the 13 registered live births excluded on grounds of nonresidence of the mother, no deaths occurred in the city. In most cases these mothers probably left the city soon after the birth of the child, and the deaths, if any, occurring among this group were not registered in the city. Of the births to mothers resident in the city both at the time of the infant's birth and the agent's visit, 15 were excluded on the ground of illegitimacy; 2 of these died before the end of the first year. A total of 2,253 live births, then, was included in the study and 193 infant deaths occurred among them.

The infant mortality rate for births included in the study was 85.7; for the excluded groups the rate varies with the reasons for exclusion. The rate for illegitimate births is usually high. The rate for cases where the mother was not found or had moved away from the city is somewhat lower than the rates for births included in the study, but is obviously less than the true rate. No fair rate can be made for the group of infants whose mothers moved away from the city or could not be found where the birth was not registered because most of the information was obtained from death certificates. The rate for all known live births, both included and excluded, was 88.8, a rate which is only slightly above the rate for the live births included in the study.

EXCLUSION TABLE 1.—Registered and unregistered live births in Akron, infant deaths, and infant mortality rates for births included in and for births excluded from detailed analysis, by reason for exclusion.

Inclusions or exclusions and reasons for exclusions.	Live births.			Infant deaths.			Infant mortality rate. ^a		
	Total.	Registered.	Unregistered.	Total.	Births registered.	Births unregistered.	Total.	Births registered.	Births unregistered.
Total known live births.....	2,906	2,575	331	258	207	51	88.8	80.4	154.1
Total live births included.....	2,253	1,944	309	193	156	37	85.7	80.2	119.7
Total live births excluded.....	653	631	22	65	51	14	99.5	80.8	.....
Reasons for exclusion:									
Nonresidence or lack of information: Total.....	638	618	20	63	49	14	98.7	79.3	.....
Not found.....	129	126	3	13	10	3	100.8	70.4	.....
Nonresident.....	13	13	.....	.....	.....	.....	.....	.....	.....
Removed.....	496	479	17	50	39	11	100.8	81.4	.....
Illegitimacy.....	15	13	2	2	2	.....	.....	.....	.....

^a Not shown where base is less than 100.

From the figures secured light may be thrown upon the completeness of registration of live births in Akron. If the deaths where the births had not been registered are compared with the total deaths in the city among births in the selected year, the figure of 19 per cent is obtained as an index of the proportion of live births not registered. This index gives the true percentage of births not registered only in case the mortality in the groups where registration is faulty is the same as the average. The mortality rates are usually high in the foreign-born and low-earnings groups among which the registration is probably least complete. This percentage, therefore, probably represents a maximum statement of the percentage of births unregistered.

Another method of determining the percentage of live births not registered is by comparing with the total number of births the unregistered births discovered. There were 331 unregistered live births—11.4 per cent of the total number of live births known to have occurred in the city in the selected year. As suggested above,

fairer comparison is of the 309 unregistered live births to mothers who were resident in the city not only at the time of the birth but also at the time of the canvass and at the agent's visit with the 2,253 live births in the same group. This gives a percentage of 13.7 unregistered. This percentage probably represents a somewhat conservative statement of the births not registered because it includes only those cases where an unregistered birth was known to have occurred.

It was shown above that of the registered births included in the study, the canvass failed to find 7.6 per cent. If the same percentage of omissions were applicable to the unregistered births included in the study, approximately 1 per cent more births occurred which should have been included. To find the percentage of omissions of the births in the city, something should be added on account of the infants whose mothers moved away from the city, which the canvass might obviously fail to secure. The true percentage then lies above 13.7 but probably falls below the figure given by the first method.

Stillbirth rates.

Stillbirth rates were formed by dividing the number of stillbirths by the total number of births, live and stillbirths. A stillbirth is defined as a dead-born issue of seven or more months' gestation. Miscarriages, or dead-born issues of less than seven months' gestation, were excluded.

A policy of exclusions was followed similar to that for infant mortality. Stillbirths to nonresident mothers were excluded because of the possible effect of other conditions; likewise stillbirths to mothers who moved away prior to the visit of the agent. In the latter cases the information would have been difficult to obtain, and there was the same chance of omission of births as in calculating the infant mortality rate.

With reference to the accuracy of the data the registration of stillbirths has a margin of error of its own. Usually a stillbirth must be registered both as a "death," and as a "birth"; in some States the law is not clear whether stillbirths have to be registered at all; and in others miscarriages as well as stillbirths must be registered. It sometimes happens that a stillbirth is registered as a "death" but not as a "birth" where registration of both is required by law. It is obvious that such an omission is one of carelessness only, as ordinarily the same person, usually a physician, would register both.

The number of unregistered stillbirths would be difficult to determine. Twelve cases of omission of stillbirths were discovered in the course of the canvass but others not found may have occurred. It is much more difficult to check up the registration of stillbirths by means of a canvass than the registration of live births.

Omissions might be due to ignorance of the law or failure to observe it. Doctors are probably more conversant with the law than mid-

wives. There is chance for confusion between stillbirths and infant deaths on the one hand, where it is difficult to determine whether or not the child was born alive; and between stillbirths and miscarriages on the other, where it is difficult to state accurately the number of months of gestation. If the law requires the reporting of miscarriages, the number of stillbirths is probably more complete than where they are not reported.

In the stillbirth rates presented in the infant mortality reports of the Children's Bureau, the stillbirths to resident married mothers that were registered either as births or deaths have been compared to the registered births to resident married mothers for Manchester, Brockton, and New Bedford; in other cities the figure for stillbirths is compared to the total registered and known unregistered births to resident married mothers.

Stillbirths excluded.

There were 115 known stillbirths and miscarriages in Akron. Nineteen of these were excluded because they were known to be miscarriages of less than 7 months' gestation. Twenty-seven more were excluded because the mothers had moved out of the city or were nonresident or because they could not be found. In these cases it could not always be determined definitely whether the birth was a stillbirth or a miscarriage. There were 69 stillbirths to mothers resident in the city both at the time of the birth of the child and at the agent's visit. No stillbirths were found to have been illegitimate. The rate for the included group is formed by dividing 69 stillbirths by the 2,975 births included in the study, giving a percentage of stillbirths of 2.3. No rate has been formed for the nonresident, not found, or removed groups because it can not be determined from the records whether or not the birth was a stillbirth or a miscarriage.

EXCLUSION TABLE 2.—*Stillbirths and miscarriages in Akron, included in and excluded from detailed analysis, by reason for exclusion.*

Inclusions or exclusions and reason for exclusion.	Number.
Total known stillbirths and miscarriages.....	115
Total stillbirths included.....	69
Total stillbirths and miscarriages excluded.....	46
Reasons for exclusion:	
Nonresidence or lack of information: Total.....	27
Not found.....	5
Nonresident.....	3
Removed.....	19
Miscarriages excluded.....	19



GENERAL TABLES

GENERAL TABLES.

TABLE 1.—*Births during selected year in each section of residence, according to nationality of mother.*

Nationality of mother.	Total births.	Section of residence.								
		East Ex-change.	South West.	West.	North Hill.	West Hill.	South Central.	Valley.	East Hill.	Business.
All mothers.....	2,322	321	249	378	76	203	338	331	118	306
Native mothers.....	1,402	228	182	252	64	162	134	149	93	138
Both parents native.....	973	152	123	178	49	104	102	102	65	98
One or both parents foreign born.	423	75	59	73	15	58	31	46	28	38
Parentage not specified.....	6	1		1			1	1		2
Foreign-born mothers.....	920	93	67	126	12	41	204	182	25	170
German.....	228	40	12	30	3	13	72	17	7	32
Italian.....	152	5		4	7	1	15	62	2	56
Slavic.....	192	12	19	14		2	43	65		37
Magyar.....	109	4	13	18			44	17	2	11
English, Irish, Scotch, and Welsh ^a	76	14	16	11	1	9	3	9	8	5
Jewish.....	61	6	3	33	1	8	2	3	1	4
All other ^b	104	12	4	16		8	25	9	5	25

^a Includes 46 English, 19 Irish, 9 Scotch, and 2 Welsh.

^b Includes 28 Syrian, 21 Scandinavian, 18 Roumanian, 11 Lithuanian, 11 English Canadian, 9 French, 1 French Canadian, 1 Greek, 1 Armenian, 1 Dutch, and 2 foreign colored.

TABLE 2.—*Live births during selected year, infant deaths, and infant mortality rate, according to literacy of mother.*

Literacy ^a of mother.	Live births.	Infant deaths.	Infant mortality rate. ^b
All mothers.....	2,253	193	85.7
Literate.....	2,043	171	83.7
Illiterate.....	205	22	107.3
Not reported.....	5		
Native mothers.....	1,356	95	70.1
Literate.....	1,351	95	70.3
Illiterate.....	4		
Not reported.....	1		
Foreign-born mothers.....	897	98	109.3
Literate.....	692	76	109.8
Illiterate.....	201	22	109.5
Not reported.....	4		
German.....	219	23	105.0
Literate.....	198	22	111.1
Illiterate.....	21	1	
Slavic.....	191	28	146.6
Literate.....	137	21	153.3
Illiterate.....	50	7	
Not reported.....	4		
Italian.....	146	17	116.4
Literate.....	77	8	
Illiterate.....	69	9	
Magyar.....	107	11	102.8
Literate.....	93	8	
Illiterate.....	14	3	
All other.....	234	19	81.2
Literate.....	187	17	90.9
Illiterate.....	47	2	

^a Persons who can read and write in any language are reported literate.

^b Not shown where base is less than 100.

TABLE 3.—*Live births to foreign-born mothers during selected year, infant deaths, and infant mortality rate, according to nationality of mother and her ability to speak English.*

Nationality of mother and ability to speak English.	Live births.	Infant deaths.	Infant mortality rate. ^a
All foreign-born mothers.....	897	98	109.3
English-speaking nationalities.....	84	6	.....
Non-English speaking nationalities.....	813	92	113.2
Able to speak English.....	314	32	101.9
Unable to speak English.....	499	60	120.2
German mothers.....	219	23	105.0
Able to speak English.....	109	11	100.9
Unable to speak English.....	110	12	109.1
Other foreign-born mothers.....	594	69	116.2
Able to speak English.....	205	21	102.4
Unable to speak English.....	389	48	123.4

^a Not shown where base is less than 100.TABLE 4.—*Births during selected year to foreign-born mothers resident in the United States specified number of years, according to nationality of mother.*

Nationality of mother.	Births during selected year to foreign-born mothers.							
	Total.	Years of residence of mother in United States.						
		Under 3.	3 to 5.	6 to 8.	9 to 11.	12 to 14.	15 and over.	No report.
All foreign-born mothers.....	920	287	235	154	88	46	106	4
German.....	226	53	63	37	14	9	43	3
Italian.....	152	53	33	27	18	9	12	.....
Slavic.....	192	78	59	29	17	3	6	.....
Magyar.....	109	43	38	14	8	3	3	.....
English, Irish, Scotch, and Welsh ^a	76	23	19	12	5	2	15	.....
Jewish.....	61	8	5	15	18	7	8	.....
All other ^b	104	29	18	20	4	13	19	1

^a Includes 46 English, 19 Irish, 9 Scotch, and 2 Welsh.^b Includes 24 Syrian, 21 Scandinavian, 18 Roumanian, 11 Lithuanian, 11 English Canadian, 9 French, 1 French Canadian, 1 Greek, 1 Armenian, 1 Dutch, and 2 foreign colored.TABLE 5.—*Births from all pregnancies,^a live births, infant deaths, infant mortality rate, and number and per cent of stillbirths, according to nationality of mother.*

Nationality of mother.	Total moth-ers.	Total births.	Total live births.	Num-ber infant deaths.	Infant mor-tality rate. ^b	Stillbirths.	
						Num-ber.	Per cent of total births. ^b
All mothers.....	2,287	6,287	6,101	746	122.3	146	3.00
Native mothers.....	1,384	3,305	3,203	294	91.8	102	3.1
Foreign-born mothers.....	903	2,982	2,898	452	156.0	84	2.8
German.....	220	737	714	101	141.5	23	3.1
Italian.....	149	531	514	81	157.5	17	3.2
Slavic.....	.....	.....	.....	.....	.....	.....	.....
Serbo-Croatian and Slovak ^c	144	496	488	108	221.3	8	1.6
Other Slavic ^d	43	140	137	18	131.4	3	2.1
Magyar.....	108	355	344	69	200.6	11	3.1
English, Irish, Scotch, and Welsh ^e	77	187	141	20	110.5	6	3.2
Jewish.....	61	224	213	15	70.4	11	4.9
All other ^f	101	312	307	40	130.3	5	1.6

^a Excluding miscarriages.^b Not shown where base is less than 100.^c Includes 81 Serbo-Croatian and 64 Slovak. (61 Slovak and 3 Slovenian.)^d Includes 30 Polish, 3 Bohemian, 5 Russian, and 5 Ruthenian.^e Includes 46 English, 19 Irish, 10 Scotch, and 2 Welsh.^f Includes 28 Syrian, 21 Scandinavian, 18 Roumanian, 11 Lithuanian, 9 English Canadian, 9 French, 1 French Canadian, 1 Greek, 1 Armenian, 1 Dutch, and 1 foreign colored.

TABLE 6.—*Mothers reporting specified number of births from all pregnancies, by nationality.*

Nationality of mother.	Total moth- ers.	Mothers reporting specified number of births. ^a																
		1	2	3	4	5	6	7	8	9	10	11	12	13	15	17		
All mothers.....	2,287	815	546	337	210	144	76	62	36	25	17	7	5	4	2	1		
Native mothers.....	1,384	585	354	184	102	66	32	24	12	11	3	5	2	2	1	1		
Foreign-born mothers.....	903	230	192	153	108	78	44	38	24	14	14	2	3	2	1	...		
German.....	220	53	55	36	23	19	8	5	7	6	6	...	...	2	...	...		
Italian.....	149	32	29	28	19	11	11	10	4	3	2	...	...	...	1	...		
Slavic:																		
Serbo-Croatian and Slovak ^b	144	31	27	33	13	16	5	9	5	3	2	...	...	...	...	...		
Other Slavic ^c	43	12	10	4	7	3	2	3	1	...	...	...	1	...	...	...		
Magyar.....	106	26	20	21	18	10	4	2	2	2	1	2	...	...	...	...		
English, Irish, Scotch, and Welsh ^d	77	31	17	10	11	3	3	1	1	...	...	...	...	...	...	...		
Jewish.....	61	13	11	10	7	8	4	3	3	...	1	...	...	1	...	...		
All other ^e	101	32	23	11	11	8	7	5	1	...	2	...	1	...	...	...		

^a Excluding miscarriages.^b Includes 80 Serbo-Croatian and 64 Slovak (61 Slovak and 3 Slovenian).^c Includes 30 Polish, 3 Bohemian, 5 Russian, and 5 Ruthenian.^d Includes 46 English, 19 Irish, 10 Scotch, and 2 Welsh.^e Includes 28 Syrian, 21 Scandinavian, 18 Roumanian, 11 Lithuanian, 9 English Canadian, 9 French Canadian, 1 Greek, 1 Armenian, 1 Dutch, and 1 foreign colored.TABLE 7.—*Number and per cent distribution of deaths among infants born during selected year in Akron and of infant deaths in the registration area in 1914, according to detailed cause of death.*

Abridged International List. ^a	Detailed International List. ^a	Cause of death. ^b	Infant deaths in—			
			Akron.		Registration area.	
			Number.	Per cent distribution.	Number.	Per cent distribution.
		All causes.....	193	100.0	155,075	100.0
		Gastric and intestinal diseases. ^c	46	23.8	37,736	24.3
24.....	102, 103.....	Diseases of the stomach.....	3	1.6	2,556	1.6
25.....	104.....	Diarrhea and enteritis.....	43	22.3	35,180	22.7
		Respiratory diseases ^d	23	11.9	24,036	15.5
20.....	89.....	Acute bronchitis.....	3	1.6	3,458	2.2
Part of 23.....	91.....	Bronchopneumonia.....	12	6.2	13,053	8.8
22.....	92.....	Pneumonia.....	8	4.1	6,925	4.5
Part of 33.....	150.....	Malformations.....	9	4.7	9,663	6.2
		Early infancy.....	65	33.7	52,535	33.9
Part of 33.....	151 (1).....	Premature birth.....	39	20.2	28,270	18.2
Part of 33.....	151 (2), 152 (2), 153.....	Congenital debility.....	20	10.4	18,549	12.0
Part of 37.....	152 (1).....	Injuries at birth.....	6	3.1	5,716	3.7
		Epidemic diseases ^e	13	6.7	12,714	8.2
5.....	6.....	Measles.....	1	.5	1,041	.7
6.....	7.....	Scarlet fever.....	...	...	204	.1
7.....	8.....	Whooping cough.....	4	2.1	3,899	2.5
8.....	9.....	Diphtheria and croup.....	1	.5	977	.6
9.....	10.....	Influenza.....	...	...	481	.3
Part of 12.....	14.....	Dysentery.....	2	1.0	573	.4
Part of 12.....	18.....	Erysipelas.....	...	...	740	.5
Part of 37.....	24.....	Tetanus.....	...	...	368	.2
13.....	28, 29.....	Tuberculosis of the lungs.....	1	.5	883	.6
14.....	30.....	Tuberculous meningitis.....	2	1.0	1,118	.7
15.....	31, 32, 33, 34, 35.....	Other forms of tuberculosis.....	...	...	448	.3
Part of 37.....	37.....	Syphilis.....	2	1.0	1,982	1.3
35.....	155 to 186.....	External causes.....	1	.5	1,926	1.2
38.....	187, 188, 189.....	Diseases ill defined or unknown.....	10	5.2	2,964	1.9
		All other causes.....	26	13.5	13,501	8.7
17.....	61.....	Meningitis.....	4	2.1	1,659	1.1
Part of 37.....	71.....	Convulsions.....	3	1.6	2,950	1.9
19.....	79.....	Organic diseases of the heart.....	4	2.1	596	.4
		Other.....	15	7.8	8,296	5.3

^a The numbers indicate the classification in the abridged and the detailed lists, respectively, of the Manual of the International List of Causes of Death.^b The causes of death included in this list are those used by the United States Bureau of the Census (see Mortality Statistics, 1914, p. 669) in classifying the deaths of infants under 1 year. They are those causes of death or groups of causes which are most important at this age. The numbers of the detailed and abridged international lists will facilitate their identification. In order to make discussion of the figures easier, these causes of death have been grouped in eight main groups.^c The term "gastric and intestinal diseases" as used in the tables and discussion includes, as above shown, only the diseases of this type which are most important among infants, i. e., diseases of the stomach, diarrhea, and enteritis. It does not include all "diseases of the digestive system" as classified under this heading according to the detailed International List.^d "Respiratory diseases" as used in the tables and discussion similarly includes only those of the respiratory diseases which are most important among infants, i. e., acute bronchitis, bronchopneumonia, and pneumonia. It does not include all "diseases of the respiratory system" as classified under this heading according to the detailed International List.^e "Epidemic diseases" as used in the tables and discussion includes only those of this group which are most important among infants.

TABLE 8.—Deaths from specified causes among infants born during selected year, according to district of residence.

District of residence.	Total deaths.	Deaths from specified causes.										
		Gastric and intestinal diseases.	Respiratory diseases.	Malformations.	Early infancy.				Epidemic diseases.	External causes.	Diseases ill defined or unknown.	All other causes.
					Total.	Premature birth.	Con-genital debility.	In-juries at birth.				
All districts.	193	46	23	9	65	39	20	6	13	1	10	26
East Exchange....	17	3	2	1	8	3	5	.....	.....	.....	.....	3
Southwest.....	14	1	3	1	8	5	2	1	1	.....	.....	.....
West.....	30	7	2	2	8	6	1	1	2	.....	1	8
North Hill.....	6	.....	1	.....	2	2	.....	.....	.....	.....	1	2
West Hill.....	18	1	2	1	7	3	3	1	4	.....	.....	3
South Central.....	30	15	3	1	8	6	2	.....	.....	.....	1	2
Valley.....	36	7	3	3	14	9	4	1	2	.....	3	4
East Hill.....	11	1	3	.....	3	1	1	1	2	.....	1	1
Business.....	31	11	4	.....	7	4	2	1	2	1	3	3

TABLE 9.—Deaths among infants born during selected year, occurring in specified calendar month, by cause of death.

Cause of death.	Total infant deaths.	Deaths occurring in specified calendar month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All causes.	193	14	18	20	13	14	10	17	24	23	12	13	15
Gastric and intestinal diseases.	46	2	2	2	1	2	4	9	9	9	1	3	2
Respiratory diseases.	23	3	3	5	2	2	2	—	1	—	2	1	2
Malformations.	9	2	—	1	1	2	—	1	1	—	1	—	—
Early infancy.	65	2	9	4	3	6	3	3	7	11	6	5	6
Premature birth.	39	1	4	2	2	4	3	2	5	5	5	3	3
Congenital debility.	20	1	3	2	1	2	—	1	2	5	—	1	2
Injuries at birth.	6	—	2	—	—	—	—	—	—	1	1	1	1
Epidemic diseases.	13	1	2	—	2	2	—	—	3	—	—	1	2
External causes.	1	—	—	—	—	—	—	—	—	1	—	—	—
Diseases ill-defined or unknown.	10	—	—	2	1	—	—	3	1	1	—	1	1
All other causes.	26	4	2	6	3	3	1	1	2	1	2	2	2

TABLE 10.—Deaths among infants born during selected year, occurring in specified month of life, by cause of death.

Cause of death.	Deaths occurring in specified month of life.													
	Total infant deaths.	First.			Second.	Third.	Fourth.	Fifth.	Sixth.	Seventh.	Eighth.	Ninth.	Tenth.	Twelfth.
		Total.	Under 2 weeks.	2 weeks but under 1 month.										
All causes.....	193	94	73	21	19	20	14	11	7	6	5	6	8	3
Gastric and intestinal diseases.....	46	8	3	5	7	6	4	7	5	2			5	2
Respiratory diseases.....	23	3	1	2	5	4	4	1		1	1	3	1	
Malformations.....	9	8	7	1			1							
Early infancy.....	65	54	45	9	7	3			1					
Premature birth.....	39	38	32	6		1								
Congenital debility.....	20	10	7	3	7	2			1					
Injuries at birth.....	6	6	6											
Epidemic diseases.....	13	2	1	1		5	1	1		1	1	2		
External causes.....	1	1	1											
Diseases ill defined or unknown.....	10	7	6	1			1	1			1			
All other causes.....	26	11	9	2		2	3	1	1	2	2	1	2	1

TABLE 11.—*Number and per cent distribution of deaths among infants born during selected year in Akron, and per cent distribution of infant deaths in the registration area, by age at death.*

Age at death.	Infant deaths in—		
	Akron.	Registration area, 1914 ^a (per cent distribution).	
	Number.	Per cent distribution.	
All ages.....	193	100.0	100.0
Under 1 month.....	94	48.7	45.5
Less than 1 day.....	33	17.1	14.6
1 day but less than 2.....	5	2.6	5.1
2 days but less than 3.....	8	4.1	3.7
3 days but less than 7.....	12	6.2	7.3
1 week but less than 2.....	15	7.8	6.5
2 weeks but less than 1 month.....	21	10.9	8.4
1 month but less than 2.....	19	9.8	9.2
2 months but less than 3.....	20	10.4	7.6
3 months but less than 6.....	32	16.6	16.7
6 months but less than 9.....	17	8.8	11.9
9 months but less than 12.....	11	5.7	9.2

^a Derived from Table 11, p. 660, Mortality Statistics, 1914, Bureau of the Census.TABLE 12.—*Births from all pregnancies.^a live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to order of pregnancy and age of mother.*

Order of pregnancy and age of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^b	Stillbirths.	
					Number.	Per cent of total births. ^c
All pregnancies, all ages.....	6,287	6,101	746	122.3	186	3.0
Under 20.....	745	718	129	179.7	27	3.6
20 to 24.....	2,442	2,370	280	118.1	72	2.9
25 to 29.....	1,810	1,772	202	114.0	38	2.1
30 to 34.....	832	805	87	108.1	27	3.2
35 to 39.....	361	347	32	92.2	14	3.9
40 and over.....	80	78	10	12.5	2	.....
Not reported.....	17	11	6	.....	6	.....
First pregnancy, all ages.....	2,241	2,153	270	125.4	88	3.9
Under 20.....	594	568	94	165.5	26	4.4
20 to 24.....	1,133	1,087	129	118.7	46	4.1
25 to 29.....	410	401	39	97.3	9	2.2
30 to 34.....	84	79	5	.....	5	.....
35 to 39.....	16	14	1	.....	2	.....
40 and over.....	1	1	1	.....	.....	.....
Not reported.....	3	3	1	.....	.....	.....
Second pregnancy, all ages.....	1,448	1,411	151	107.0	37	2.6
Under 20.....	130	129	31	240.3	1	.8
20 to 24.....	753	735	72	98.0	18	2.4
25 to 29.....	420	407	36	88.5	13	3.1
30 to 34.....	112	108	8	74.1	4	3.6
35 to 39.....	26	26	2	.....	.....	.....
40 and over.....	3	3	.....	.....	.....	.....
Not reported.....	4	3	2	.....	1	.....
Third pregnancy, all ages.....	921	907	110	121.3	14	1.5
Under 20.....	17	17	3	.....	.....	.....
20 to 24.....	363	358	42	117.3	5	1.4
25 to 29.....	374	369	48	130.1	5	1.3
30 to 34.....	124	121	13	107.4	3	2.4
35 to 39.....	37	36	3	.....	1	.....
40 and over.....	4	4	.....	.....	.....	.....
Not reported.....	2	2	1			

^a Excluding miscarriages.^b Not shown where base is less than 100.

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TABLE 12.—*Births from all pregnancies, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to order of pregnancy and age of mother—Contd.*

Order of pregnancy and age of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate.	Stillbirths.	
					Number.	Per cent of total births.
Fourth pregnancy, all ages.....	595	581	65	111.9	14	2.4
Under 20.....	3	3	1			
20 to 24.....	147	145	25	172.4	2	1.4
25 to 29.....	284	277	28	101.1	7	2.5
30 to 34.....	128	125	11	88.0	3	2.3
35 to 39.....	30	29			1	
40 and over.....	3	2			1	
Not reported.....						
Fifth pregnancy, all ages.....	333	337	50	144.7	6	1.5
Under 20.....	1	1				
20 to 24.....	33	32	6		1	
25 to 29.....	183	181	26	113.6	2	1.1
30 to 34.....	126	125	16	128.0	1	.8
35 to 39.....	40	38	4		2	
40 and over.....	9	9	3			
Not reported.....	1	1	1			
Sixth pregnancy, all ages.....	254	247	34	137.7	7	2.8
Under 20.....						
20 to 24.....	9	9	4			
25 to 29.....	89	88	16		1	
30 to 34.....	96	92	12		4	
35 to 39.....	51	51	1			
40 and over.....	6	6				
Not reported.....	3	1	1		2	
Seventh pregnancy, all ages.....	167	158	17	107.6	9	5.4
20 to 24.....	4	4	2			
25 to 29.....	28	27	4		1	
30 to 34.....	77	72	5		5	
35 to 39.....	46	44	6		2	
40 and over.....	10	10				
Not reported.....	2	1			1	
Eighth pregnancy, all ages.....	104	99	14		5	4.9
25 to 29.....	14	14	3			
30 to 34.....	45	44	8		1	
35 to 39.....	39	30	2		3	
40 and over.....	5	5	1			
Not reported.....	1				1	
Ninth pregnancy, all ages.....	67	66	10		1	
25 to 29.....	5	5	1			
30 to 34.....	24	23	6		1	
35 to 39.....	28	28	3			
40 and over.....	10	10				
Tenth pregnancy, all ages.....	36	33	6		3	
25 to 29.....	3	3	1			
30 to 34.....	9	9	2			
35 to 39.....	16	14	2		2	
40 and over.....	7	7	1			
Not reported.....	1				1	
Eleventh pregnancy, all ages.....	25	24	1		1	
30 to 34.....	5	5				
35 to 39.....	13	12			1	
40 and over.....	7	7	1			
Twelfth pregnancy, all ages.....	17	17	6			
30 to 34.....	2	2	1			
35 to 39.....	11	11	4			
40 and over.....	4	4	1			
Thirteenth pregnancy, all ages.....	9	9	2			
35 to 39.....	5	5	2			
40 and over.....	4	4				

TABLE 12.—*Births from all pregnancies, live births, infant deaths, infant mortality, rate, and per cent of stillbirths, according to order of pregnancy and age of mother—Contd.*

Order of pregnancy and age of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate.	Stillbirths.	
					Number.	Per cent of total births.
Fourteenth pregnancy, all ages.....	4	4	2			
15 to 39.....	2	2	2			
40 and over.....	2	2				
Fifteenth pregnancy, all ages.....	4	3			1	
15 to 39.....	1	1				
40 and over.....	3	2			1	
Sixteenth pregnancy, all ages.....	1	1	1			
40 and over.....	1	1	1			
Seventeenth pregnancy, all ages.....	1	1	1			
40 and over.....	1	1	1			

TABLE 13.—*Births during selected year to mothers of specified nativity, according to kind and duration of help in confinement.*

Kind and duration of help in confinement.	Total births.	Births to native mothers.	Births to foreign-born mothers.
All kinds.....	2,322	1,402	920
None or members of household.....	318	125	193
Trained nurse.....	253	225	28
Under 1 week.....	20	16	4
1 week, under 2.....	48	39	9
2 weeks, under 1 month.....	158	149	10
1 month or more.....	27	22	5
No report.....			
Hospital.....	200	145	55
Under 1 week.....	4	4	
1 week, under 2.....	113	77	36
2 weeks, under 1 month.....	73	56	17
1 month or more.....	4	3	1
No report.....	6	5	1
Other help.....	1,550	906	644
Under 1 week.....	84	14	70
1 week, under 2.....	394	178	206
2 weeks, under 1 month.....	775	505	270
1 month or more.....	302	206	96
No report.....	5	3	2
No report.....	1	1	

TABLE 14.—*Births during selected year to mothers of specified nativity, according to usual hired household help.*

Usual hired household help.	Total births.	Births to native mothers.	Births to foreign-born mothers.
All mothers.....	2,322	1,402	920
No hired help.....	1,864	1,028	836
Laundress and other partial help.....	358	291	67
Servants kept.....	91	76	15
Mother boards.....	3	2	1
Not reported.....	6	5	1

TABLE 15.—*Live births during selected year, infant deaths, and infant mortality rate, according to interval between confinement and mother's resumption of part of household duties, and nativity of mother.*

Interval between confinement and mother's resumption of part of household duties after confinement, and nativity of mother.	Live births.	Infant deaths.	Infant mortality rate. ^a
All mothers.....	2,253	193	85.7
6 days or less.....	190	22	115.8
7 to 10 days.....	657	59	89.8
11 to 15 days.....	836	60	71.8
Over 15 days.....	539	49	87.7
Not reported ^b	11	3	.....
Native mothers.....	1,356	95	70.1
6 days or less.....	18	1	.....
7 to 10 days.....	328	26	79.3
11 to 15 days.....	573	35	61.1
Over 15 days.....	429	31	72.3
Not reported ^c	8	2	.....
Foreign-born mothers.....	897	98	109.3
6 days or less.....	172	21	122.1
7 to 10 days.....	329	33	100.3
11 to 15 days.....	263	25	95.1
Over 15 days.....	130	18	138.5
Not reported ^d	3	1	.....

^a Not shown where base is less than 100.^b Including 7 mothers who died after confinement before resuming any household duties.^c Including 6 mothers who died after confinement before resuming any household duties.^d Including 1 mother who died after confinement before resuming any household duties.

TABLE 16.—Number and per cent distribution of infants born during selected year and surviving at end of specified month, according to type of feeding during that month, and nationality of mother.

Type of feeding and nationality of mother.	Infants born during selected year and surviving at end of—																	
	First month.		Second month.		Third month.		Fourth month.		Fifth month.		Sixth month.		Seventh month.		Eighth month.		Ninth month.	
	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.	Num-ber.	Per cent dis-tribu-tion.
All mothers.....	2,159	100.0	2,140	100.0	2,120	100.0	2,106	100.0	2,065	100.0	2,068	100.0	2,082	100.0	2,077	100.0	2,071	100.0
Breast exclusively.....	1,897	87.9	1,734	81.0	1,574	74.2	1,389	66.0	1,277	61.0	1,148	55.0	880	42.3	753	36.3	595	28.7
Mixed.....	107	5.0	171	8.0	217	10.2	315	15.0	379	18.1	461	22.1	683	32.9	764	36.8	863	41.8
Artificial exclusively.....	154	7.1	234	10.9	329	15.5	402	19.1	439	21.0	479	22.9	517	24.8	560	27.0	611	28.5
Not reported.....	1	(*)	1	(*)														
Native mothers.....	1,302	100.0	1,294	100.0	1,286	100.0	1,278	100.0	1,275	100.0	1,274	100.0	1,272	100.0	1,270	100.0	1,265	100.0
Breast exclusively.....	1,144	87.9	1,043	80.6	942	73.3	826	64.6	765	60.0	694	54.5	534	42.0	459	36.1	350	27.7
Mixed.....	53	4.1	85	6.6	106	8.2	162	12.7	192	15.1	237	18.6	370	29.1	426	33.5	507	40.1
Artificial exclusively.....	105	8.1	166	12.8	238	18.5	290	22.7	318	24.9	343	26.9	368	28.9	385	30.3	408	32.3
Foreign-born mothers.....	857	100.0	846	100.0	834	100.0	828	100.0	820	100.0	814	100.0	810	100.0	807	100.0	806	100.0
Breast exclusively.....	753	87.9	691	81.7	632	75.8	563	68.0	512	62.4	434	53.5	346	42.7	234	29.4	215	30.4
Mixed.....	54	6.3	86	10.2	111	13.3	153	18.5	187	22.8	224	27.5	315	38.9	338	41.9	358	44.4
Artificial exclusively.....	49	5.7	69	8.0	91	10.9	112	13.5	121	14.8	136	16.7	149	18.4	175	21.7	203	25.2
Not reported.....	1	.1	1	.1														
German mothers.....	210	100.0	207	100.0	203	100.0	203	100.0	202	100.0	201	100.0	199	100.0	198	100.0	198	100.0
Breast exclusively.....	178	84.8	153	73.9	139	68.5	117	57.6	108	53.5	97	48.3	75	37.7	69	34.8	62	31.3
Mixed.....	23	11.0	37	17.9	41	20.2	53	26.1	58	28.7	65	32.3	82	41.2	85	42.9	84	42.4
Artificial exclusively.....	8	3.8	16	7.7	23	11.3	33	16.3	36	17.8	39	19.4	42	21.1	44	22.2	52	26.3
Not reported.....	1	.5	1	.5														
Slavic mothers.....	182	100.0	180	100.0	176	100.0	173	100.0	170	100.0	167	100.0	165	100.0	164	100.0	164	100.0
Breast exclusively.....	164	90.1	149	82.8	138	78.4	122	70.5	107	62.9	96	57.5	68	41.2	56	34.1	48	28.3
Mixed.....	12	6.6	21	11.7	25	14.2	35	20.2	41	25.9	50	29.9	75	45.5	80	48.8	86	62.4
Artificial exclusively.....	6	3.3	10	5.6	13	7.4	16	9.2	19	11.2	21	12.6	22	13.3	28	17.1	30	18.3
Italian mothers.....	140	100.0	138	100.0	136	100.0	134	100.0	133	100.0	132	100.0	132	100.0	131	100.0	131	100.0
Breast exclusively.....	127	90.7	123	89.1	114	83.8	106	79.1	93	69.9	84	63.6	63	46.2	50	38.2	41	31.3
Mixed.....	5	3.6	7	5.1	11	8.1	14	10.4	14	10.4	19	14.4	21	15.9	31	23.9	54	41.2
Artificial exclusively.....	8	5.7	8	5.8	11	8.1	14	10.4	16	12.0	19	14.4	21	15.9	30	22.9	36	27.5
Magyar mothers.....	100	100.0	97	100.0	97	100.0	96	100.0	96	100.0	96	100.0	96	100.0	96	100.0	96	100.0
Breast exclusively.....	87	87.0	79	81.4	68	70.1	58	60.4	53	55.2	48	50.0	32	33.3	23	30.2	27	28.1
Mixed.....	7	7.0	9	9.3	16	16.5	25	26.0	28	29.2	32	33.3	47	49.0	47	49.0	41	42.7
Artificial exclusively.....	6	6.0	9	9.3	13	13.4	13	13.5	15	15.6	16	16.7	17	17.7	20	20.8	28	28.2
Other foreign-born mothers.....	225	100.0	224	100.0	222	100.0	222	100.0	219	100.0	218	100.0	218	100.0	218	100.0	217	100.0
Breast exclusively.....	197	87.6	157	83.5	173	77.9	160	72.1	151	68.9	129	59.2	129	59.2	90	41.3	67	30.9
Mixed.....	17	8.1	25	11.2	31	14.0	26	11.7	33	15.1	48	22.0	69	31.7	75	34.4	92	42.9
Artificial exclusively.....	21	9.3	42	18.7	36	16.1	36	16.2	35	16.0	41	18.9	47	21.6	53	24.3	57	26.3

* Less than one-tenth of 1 per cent.

INFANT MORTALITY.

TABLE 17.—*Per cent of infants born during selected years in Johnstown, Pa., and in Akron, given specified type of feeding at 3, 6, and 9 months of age, according to nativity of mother.*

Nativity of mother and age of infant.	Per cent of infants.					
	Breast fed exclusively.		Mixed fed.		Artificially fed exclusively.	
	Johns-town.	Akron.	Johns-town.	Akron.	Johns-town.	Akron.
Native mothers:						
3 months.....	66.9	73.3	12.8	8.2	20.3	18.5
6 months.....	41.1	54.5	32.8	18.6	26.1	26.9
9 months.....	11.8	27.7	54.0	40.1	34.1	32.3
Foreign-born mothers:						
3 months.....	80.5	75.8	13.1	13.3	6.4	10.9
6 months.....	54.6	55.8	35.7	27.5	9.7	16.7
9 months.....	24.3	30.4	57.0	44.4	18.6	25.2

Infants born during selected year surviving at the beginning of specified month.

Month of life and type of feeding.	All mothers.				Native mothers.				Foreign-born mothers.			
	Total.	Died in the—			Total.	Died in the—			Total.	Died in the—		
		First year.		Specified month.		First year.		Specified month.		First year.		Specified month.
		Number.	Per cent.			Number.	Per cent.			Number.	Per cent.	
First month.....	2,263	193	8.6	94	1,356	95	7.0	54	897	98	10.9	40
Breast exclusively.....	1,936	108	5.6	39	1,162	89	3.4	18	774	69	8.9	21
Mixed.....	1,108	7	6.5	1	54	2	3.7	0	54	6	9.3	3
Artificial exclusively.....	163	33	20.2	9	111	25	22.5	6	52	8	15.4	16
Not fed, died at once.....	45	45	X	45	29	29	X	29	16	16	X	16
Not reported.....	1								1			
Second month.....	2,159	99	4.6	19	1,892	41	3.1	8	887	58	6.8	11
Breast exclusively.....	1,743	54	3.1	9	1,044	19	1.8	1	699	35	5.0	8
Mixed.....	173	12	6.9	2	85	2	2.4	0	88	10	11.4	2
Artificial exclusively.....	242	33	13.6	8	173	20	11.6	7	69	13	18.8	1
Not reported.....	1								1			
Third month.....	2,140	80	3.7	20	1,264	33	2.6	8	846	47	5.6	12
Breast exclusively.....	1,582	31	2.0	8	945	12	1.3	3	637	19	3.0	5
Mixed.....	222	14	6.3	4	106	4	3.8	0	116	10	8.6	5
Artificial exclusively.....	336	35	10.4	7	243	17	7.0	5	93	18	19.4	2
Fourth month.....	2,120	60	2.8	14	1,286	25	1.9	8	834	35	4.2	6
Breast exclusively.....	1,393	18	1.3	4	827	6	.7	1	560	12	2.1	3
Mixed.....	316	10	3.2	1	162	5	3.1	0	154	5	3.2	1
Artificial exclusively.....	411	32	7.8	9	297	14	4.7	7	114	18	15.8	2

a Including 1 baby who died at beginning of month who was fed in specified way in preceding month.

TABLE 18. *Infants born during selected year to mothers of specified nativity and surviving at beginning of specified month of life, and subsequent deaths in the first year of life and in specified months, according to month of life and type of feeding—Continued.*

Month of life and type of feeding.	Infants born during selected year surviving at the beginning of specified month.														
	All mothers.					Native mothers.					Foreign-born mothers.				
	Total.	Died in the—			Total.	Died in the—			Total.	Died in the—					
		First year.		Specified month.		First year.		Specified month.		First year.		Specified month.			
		Number.	Per cent.			Number.	Per cent.			Number.	Per cent.				
Fifth month.....	2,106	46	2.2	11	1,278	17	1.3	3	828	29	3.5	8			
Breast exclusively.....	1,290	13	1.0	3	765	4	.5	.....	515	9	1.7	3			
Mixed.....	379	9	2.4	.....	192	5	2.6	.....	187	4	2.1	.....			
Artificial exclusively.....	447	24	5.4	.8	321	8	2.5	3	126	16	12.7	5			
Sixth month.....	2,095	35	1.7	7	1,276	14	1.1	1	820	21	2.6	6			
Breast exclusively.....	1,149	7	.6	1	694	4	.6	.....	455	3	.7	1			
Mixed.....	464	11	2.4	3	228	5	2.1	1	226	6	2.7	2			
Artificial exclusively.....	482	17	3.5	3	343	5	1.5	.....	139	12	8.6	3			
Seventh month.....	2,088	28	1.3	6	1,274	13	1.0	2	814	15	1.8	4			
Breast exclusively.....	a 881	a 3	.3	a 1	a 535	a 1	.2	a 1	346	2	.6	.....			
Mixed.....	685	10	1.5	.....	370	6	1.6	.....	315	4	1.3	.....			
Artificial exclusively.....	522	15	2.9	5	369	6	1.6	1	153	9	6.9	4			
Eighth month.....	2,082	22	1.1	5	1,272	11	.9	2	810	11	1.4	3			
Breast exclusively.....	754	2	.3	1	459	.....	.....	.....	295	2	.7	1			
Mixed.....	a 705	a 10	1.3	a 1	426	6	1.4	.....	a 339	a 4	1.2	a 1			
Artificial exclusively.....	563	10	1.8	3	387	5	1.3	2	176	5	2.8	1			
Ninth month.....	2,077	17	.8	6	1,270	9	.7	5	807	8	1.0	1			
Breast exclusively.....	595	1	.2	.....	350	.....	.....	.....	245	1	.4	.....			
Mixed.....	868	9	1.0	3	510	6	1.2	8	358	3	.8	.....			
Artificial exclusively.....	614	7	1.1	3	410	3	.7	2	204	4	2.0	1			

a Including 1 baby who died at beginning of month who was fed in specified way in preceding month.

a Including 1 baby who died at beginning of month who was fed in specified way in preceding month.

TABLE 19.—Number and per cent of infants artificially fed among those surviving at 3, 6, and 9 months of age, according to whether the mother had commenced work, and nativity of mother.

Gainful employment of mother at time specified, and nativity of mother.	Infants surviving at end of—								
	Third month.			Sixth month.			Ninth month.		
	Total.	Artificially fed.		Total.	Artificially fed.		Total.	Artificially fed.	
		Num-ber.	Per-cent.		Num-ber.	Per-cent.		Num-ber.	Per-cent.
All mothers.....	2,120	329	15.5	2,088	479	22.9	2,071	611	29.5
Had no work or began after specified time.....	1,744	278	15.9	1,651	393	23.8	1,587	474	29.9
Began work before time specified:									
At home.....	360	46	12.8	415	78	18.8	454	123	27.1
Away from home.....	8	4		14	7		23	13	
Time of resumption not reported.....	8	1	12.5	8	1	12.5	7	1	14.3
Native mothers.....	1,286	238	18.5	1,274	343	26.9	1,265	408	32.3
Had no work or began after specified time.....	1,132	208	18.4	1,084	295	27.2	1,049	336	32.0
Began work before time specified:									
At home.....	146	27	18.5	181	45	24.9	204	66	32.4
Away from home.....	3	2		4	2		7	5	
Time of resumption not reported.....	5	1	20.0	5	1	20.0	5	1	20.0
Foreign-born mothers.....	834	91	10.9	814	136	16.7	806	203	25.2
Had no work or began after specified time.....	612	70	11.4	567	98	17.3	538	138	25.7
Began work before time specified:									
At home.....	214	19	8.9	234	33	14.1	250	57	22.8
Away from home.....	5	2		10	5		16	8	
Time of resumption not reported.....	3			3			2		

TABLE 20.—Births during selected year in each father's earnings group, according to occupation of father.

Occupation of father.	Total births.	Births in specified father's earnings group.								
		Under \$450.	\$450 to \$549.	\$550 to \$649.	\$650 to \$849.	\$850 to \$1,049.	\$1,050 to \$1,249.	\$1,250 and over.	No earnings.	Not reported.
All occupations.....	2,322	211	163	228	581	523	264	307	19	26
Manufacturing and mechanical industries.....	1,600	152	129	175	420	390	181	140	4	9
Blacksmiths.....	12	2	2		5	2				1
Boiler makers.....	9		2	1	1	4	1			
Builders and contractors.....	43		4		4	16	8	10		1
Compositors, linotype operators, and pressmen.....	11				3	3	4	1		
Electricians and electrical engineers.....	21	1		1	3	8	4	4		
Engineers and firemen.....	26	1	1		3	7	7	7		
Factory operatives and laborers.....	1,028	106	103	144	302	240	99	31	2	1
Metal.....	86	13	18	12	20	14	6	2	1	
Rubber.....	824	65	65	105	258	212	91	27	1	
Other.....	118	28	20	27	24	14	2	2		1
Laborers, helpers, and apprentices (not in factory).....	36	17	4	6	7		1			1
Machinists, millwrights, and toolmakers.....	117	2	1	4	31	41	30	8		
Manufacturers, proprietors, managers, and officials.....	90	1	1	1	6	16	3	60	1	1
Shoemakers and cobblers (not in factory).....	6			2	3		1			
Skilled mechanics, building trades.....	168	19	9	13	42	44	20	17		1
Tailors.....	13	2	1	2	5	2		1		
Other pursuits.....	20	1	1	1	5	7	3	1	1	

TABLE 20.—Births during selected year in each father's earnings group, according to occupation of father—Continued.

TABLE 21.—*Births during selected year, infant deaths, infant mortality rate, and per cent of stillbirths, according to earnings of father and nativity of mother.*

Earnings of father and nativity of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	2,322	2,253	193	85.7	69	3.0
Native mothers.....	1,402	1,356	95	70.1	46	3.3
Under \$450.....	51	49	4		2	
\$450 to \$549.....	41	41	5			
\$550 to \$649.....	83	81	6		2	
\$650 to \$849.....	325	312	24	76.9	13	4.0
\$850 to \$1,049.....	396	379	29	76.5	17	4.3
\$1,050 to \$1,249.....	224	219	15	68.5	5	2.2
\$1,250 and over.....	267	260	10	38.5	7	2.6
No earnings.....	6	6				
No report.....	9	9	2			
Foreign-born mothers.....	920	897	98	109.3	23	2.5
Under \$450.....	160	156	20	128.2	4	2.5
\$450 to \$549.....	122	120	14	116.7	2	1.6
\$550 to \$649.....	145	142	14	98.6	3	2.1
\$650 to \$849.....	256	251	34	135.5	5	2.0
\$850 to \$1,049.....	127	121	12	99.2	6	4.7
\$1,050 to \$1,249.....	40	38			2	
\$1,250 and over.....	40	40	2			
No earnings.....	13	12	1		1	
No report.....	17	17	1			

^a Not shown where base is less than 100.

TABLE 22.—*Births from all pregnancies, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to earnings of father during year after birth of last child and nativity of mother.*

Earnings of father during year after birth of last child and nativity of mother.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	6,287	6,101	746	122.3	186	3.0
Less than \$550.....	1,339	1,290	209	162.0	49	3.7
\$550 to \$649.....	719	706	100	141.6	13	1.8
\$650 to \$849.....	1,485	1,441	191	132.5	44	3.0
\$850 to \$1,049.....	1,238	1,193	117	98.1	45	3.6
\$1,050 to \$1,249.....	634	620	51	82.3	14	2.2
\$1,250 and over.....	722	706	55	77.9	16	2.2
No earnings.....	54	52	8		2	
No report.....	96	93	15		3	
Native mothers.....	3,305	3,203	294	91.8	102	3.1
Less than \$550.....	321	309	36	116.5	12	3.7
\$550 to \$649.....	237	236	20	84.7	1	0.4
\$650 to \$849.....	718	694	73	105.2	24	3.3
\$850 to \$1,049.....	870	835	76	91.0	35	4.0
\$1,050 to \$1,249.....	513	501	41	81.8	12	2.3
\$1,250 and over.....	604	589	42	71.3	15	2.5
No earnings.....	16	15	2		1	
No report.....	26	24	4		2	
Foreign-born mothers.....	2,982	2,898	452	155.9	84	2.8
Less than \$550.....	1,018	981	173	176.3	37	3.6
\$550 to \$649.....	482	470	80	170.2	12	2.5
\$650 to \$849.....	767	747	118	158.0	20	2.6
\$850 to \$1,049.....	368	358	41	114.5	10	2.7
\$1,050 to \$1,249.....	121	119	10	84.0	2	1.7
\$1,250 and over.....	118	117	13	111.1	1	0.8
No earnings.....	38	37	6		1	
No report.....	70	69	11		1	

^a Not shown where base is less than 100.

TABLE 23.—*Births during selected year in families of specified numbers of persons and average number of persons per family, according to earnings of father and nativity of mother.*

Earnings of father and nativity of mother.	Average number of persons per family.	Total births.	Births in families of specified number of persons. ^a												No family. ^b
			1	2	3	4	5	6	7	8	9	10	11		
All mothers.....	3.3	2,322	10	954	587	338	205	99	66	33	15	8	4	3	
Under \$450.....	3.8	211	5	48	59	43	22	15	4	7	4	2	.....	2	
\$450 to \$549.....	3.8	163	1	43	45	27	22	6	12	4	2	1	.....	.....	
\$550 to \$649.....	3.5	228	.....	82	53	40	26	10	7	5	4	1	.....	.....	
\$650 to \$849.....	3.2	581	.....	271	140	73	47	24	17	5	2	1	1	.....	
\$850 to \$1,049.....	3.1	523	1	249	135	84	35	24	15	6	1	.....	2	1	
\$1,050 to \$1,249.....	3.2	264	.....	120	61	40	22	8	6	5	1	1	1	.....	
\$1,250 and over.....	3.2	307	1	125	85	51	29	8	4	1	1	2	.....	.....	
No earnings.....	2.7	19	2	9	3	3	1	1	1	.....	.....	.....	.....	.....	
No report.....	3.7	26	.....	7	6	7	1	3	2	.....	.....	.....	.....	.....	
Native mothers.....	3.1	1,402	7	644	359	183	102	46	32	13	10	4	2	.....	
Under \$450.....	3.8	51	3	11	16	8	4	2	3	1	2	1	.....	.....	
\$450 to \$549.....	4.1	41	.....	11	12	4	5	1	4	2	1	1	.....	.....	
\$550 to \$649.....	3.7	83	.....	28	20	17	5	7	.....	2	3	1	.....	.....	
\$650 to \$849.....	3.0	325	.....	167	83	34	19	11	7	3	1	.....	.....	.....	
\$850 to \$1,049.....	3.0	396	1	201	100	40	28	13	10	1	1	.....	1	.....	
\$1,050 to \$1,249.....	3.2	224	.....	104	51	36	17	6	4	3	1	1	1	.....	
\$1,250 and over.....	3.1	267	1	116	74	40	24	6	4	1	1	.....	.....	.....	
No earnings.....	2.0	6	2	3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	
No report.....	3.0	9	.....	3	3	3	.....	.....	.....	.....	.....	.....	.....	.....	
Foreign-born mothers.....	3.6	920	3	310	228	155	103	53	34	20	5	4	2	3	
Under \$450.....	3.8	160	2	37	43	35	18	13	1	6	2	1	.....	2	
\$450 to \$549.....	3.7	122	1	32	33	23	17	5	8	2	1	.....	.....	.....	
\$550 to \$649.....	3.5	145	.....	54	33	23	21	3	7	3	1	.....	.....	.....	
\$650 to \$849.....	3.4	256	.....	104	67	39	28	13	10	2	1	1	1	.....	
\$850 to \$1,049.....	3.5	127	.....	48	35	14	7	11	5	5	.....	1	.....	1	
\$1,050 to \$1,249.....	3.5	40	.....	16	10	4	5	2	1	2	.....	.....	.....	.....	
\$1,250 and over.....	3.8	40	.....	9	11	11	5	2	.....	.....	2	.....	.....	.....	
No earnings.....	3.1	13	.....	6	3	2	1	1	.....	.....	.....	.....	.....	.....	
No report.....	4.1	17	.....	4	3	4	1	3	2	.....	.....	.....	.....	.....	

^a Infant not included in number.^b Infant not living with parents

TABLE 24. - Number and per cent distribution of births during selected year in each father's earnings group, according to total earnings of family.

Total births.		Births in specified father's earnings group.																	
		Under \$450.		\$450 to \$549.		\$550 to \$649.		\$650 to \$849.		\$850 to \$1,049.		\$1,050 to \$1,249.		\$1,250 and over.		No earnings.		No report.	
		Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.	Num-ber.	Per cent tribu-tion.
Sources of family income year following baby's birth.		2,322	100.0	374	100.0	228	100.0	581	100.0	523	100.0	284	100.0	307	100.0	19	100.0	26	100.0
All sources.....		1,367	58.9	144	38.5	117	51.3	383	65.9	352	67.3	163	61.8	196	63.8	12	62.6	12	46.1
Derived from earnings only:		556	23.9	171	45.7	68	29.8	120	20.7	98	18.7	56	21.2	29	9.4	10	52.6	4	15.4
Father only wage earner.....																			
Other wage earners: Total earnings.....																			
Under \$550.....		84	3.6	74	19.8	7	3.1									10	52.6		
\$550 to \$649.....		38	1.6	31	8.3	32	14.0	30	5.2										
\$650 to \$849.....		93	4.0	31	8.3	14	6.2	56	9.6	30	5.7								
\$850 to \$1,049.....		114	4.9	14	3.7	6	2.6	12	2.1	44	8.4	15	5.7						
\$1,050 to \$1,249.....		87	3.7	10	2.7	8	3.5	18	3.1	23	4.4	41	15.5	29	9.4				
\$1,250 and over.....		127	5.5	8	2.1	1	.4	4	.7	1	.2							4	15.4
No report.....		13	.6	3	.8														
Earnings supplemented by other income.....		395	17.0	59	15.8	43	18.9	78	13.4	73	14.0	45	17.0	82	26.7	5	26.3	10	38.5
No source.....		4	.2													4	21.1		

TABLE 25.—Births during selected year to gainfully employed mothers of specified nationality, according to interval between cessation of work and confinement.

	Total births.			Births to native mothers.			Total.		German.		Italian.		Slavic.		Magyar.		Other.	
	Num-ber.	Per cent distribution.	Per cent distribution.	Num-ber.	Per cent distribution.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.
All mothers.....	2,322	.....	.....	1,402	.....	.....	920	.....	226	.....	152	.....	192	.....	109	.....	241	.....
Gainfully employed.....	656	100.0	.....	277	100.0	.....	379	100.0	71	100.0	90	100.0	101	100.0	51	100.0	66	100.0
Interval:																		
Less than 2 weeks.....	374	57.0	.....	155	54.0	.....	219	57.8	19	26.8	80	88.9	62	61.4	23	45.1	35	53.0
2 weeks but less than 1 month.....	14	2.1	.....	9	3.2	.....	5	1.3	8	11.3	.....	.....	3	3.0	1	2.0	1	1.5
1 month but less than 3.....	48	7.3	.....	18	6.5	.....	30	7.9	.....	.....	.....	.....	9	8.9	5	9.8	5	7.6
3 months but less than 9.....	167	25.3	.....	66	23.8	.....	101	26.0	35	49.3	7	7.8	21	20.8	16	31.4	22	33.3
9 months or over.....	42	6.4	.....	23	8.2	.....	19	5.0	8	11.3	.....	.....	5	5.0	5	9.8	3	4.6
Not reported.....	11	1.7	.....	6	2.2	.....	5	1.3	3	4.2	.....	.....	1	1.0	1	2.0	.....	.....
Not gainfully employed.....	1,666	.....	.....	1,126	.....	.....	541	.....	153	.....	62	.....	91	.....	58	.....	175	.....

TABLE 26.—Births during selected year to mothers gainfully employed in specified occupation during year preceding birth of infant, according to interval between cessation of work and confinement, and nativity of mother.

Interval between cessation of work and confinement, and nativity of mother.	Births to mothers gainfully employed during year before infant's birth.						
	Total.	At home.		Away from home.			
		Keep- ing lodgers.	Other home work.	In factories.		Clerks, sales- women, teach- ers.	Other work.
				Rub- ber.	All other.		
All mothers, gainfully employed.....	656	421	60	59	34	20	62
Interval:							
Under 2 weeks.....	374	346	25			2	1
2 weeks but under 1 month.....	14	11	3				
1 month but under 3.....	48	22	9	3	5	1	8
3 months but under 9.....	167	35	19	41	22	11	39
9 months or more.....	42	5	2	11	6	6	12
Not reported.....	11	2	2	1	1		2
Native mothers, gainfully employed.....	277	177	39	13	8	17	23
Interval:							
Under 2 weeks.....	155	141	13			1	
2 weeks but under 1 month.....	9	6	3				
1 month but under 3.....	18	7	6	1		1	3
3 months but under 9.....	66	20	13	7	5	9	12
9 months or more.....	23	2	2	4	2	6	7
Not reported.....	6	1	2	1	1		1
Foreign-born mothers, gainfully em- ployed.....	379	244	21	46	26	3	39
Interval:							
Under 2 weeks.....	219	205	12			1	1
2 weeks but under 1 month.....	5	5					
1 month but under 3.....	30	15	3	2	5		5
3 months but under 9.....	101	15	6	34	17	2	27
9 months or more.....	19	3		7	4		5
Not reported.....	5	1		3			1

TABLE 27.—Births during selected year, infant deaths at specified ages, infant mortality rate, and per cent of stillbirths, according to interval between cessation of work and confinement, and nativity of mother.

Interval between cessation of gainful employment and confinement, and nativity of mother.	Total births.	Live births.	Infant deaths.				Infant mortality rate. ^a	Stillbirths.	
			Total.	Under 2 weeks.	2 weeks, under 1 month.	1 month and over.		Number.	Per cent of total births. (c)
All mothers.....	2,322	2,253	193	73	21	99	85.7	69	3.0
Gainfully employed.....	656	633	68	19	8	41	107.4	23	3.5
Interval:									
Under 2 weeks.....	374	361	40	10	5	25	110.8	13	3.5
2 weeks, under 1 month.....	14	14	3	1		2			
1 month, under 3.....	48	46	4	1		3		2	
3 months, under 9.....	167	163	16	7	2	7	98.2	4	2.4
9 months or more.....	42	40	4		1	3		2	
Not reported.....	11	9	1			1		2	
Not gainfully employed.....	1,666	1,620	125	54	13	58	77.2	46	2.8
Native mothers.....	1,402	1,356	95	45	9	41	70.1	46	3.3
Gainfully employed.....	277	266	26	9	3	14	97.7	11	4.0

^a Not shown where base is less than 100.

TABLE 27. *Births during selected year, infant deaths at specified ages, infant mortality rate, and per cent of stillbirths, according to interval between cessation of work and confinement, and nativity of mother—Continued.*

Interval between cessation of gainful employment and confinement, and nativity of mother.	Total births.	Live births.	Infant deaths.				Infant mortality rate. ^a	Stillbirths.	
			Total.	Under 2 weeks.	2 weeks, under 1 month.	1 month and over.		Number.	Per cent of total births. (°).
Interval:									
Under 2 weeks.....	155	149	9	4	.....	5	60.4	6	3.9
2 weeks, under 1 month.....	9	9	1	1	.....	.....	.....	.....	.....
1 month, under 3.....	18	17	3	.....	.....	3	.....	1	.....
3 months, under 9.....	66	65	11	4	2	5	.....	1	.....
9 months or more.....	23	22	1	.....	1	.....	.....	1	.....
Not reported.....	6	4	1	.....	.....	1	.....	2	.....
Not gainfully employed.....	1,125	1,090	69	36	6	27	63.3	35	3.1
Foreign-born mothers.....	920	897	98	28	12	58	109.3	23	2.5
Gainfully employed.....	379	367	42	10	5	27	114.4	12	3.2
Interval:									
Under 2 weeks.....	219	212	31	6	5	20	146.2	7	3.2
2 weeks, under 1 month.....	5	5	2	.....	.....	2	.....	.....	.....
1 month, under 3.....	30	29	1	1	.....	.....	.....	1	.....
3 months, under 9.....	101	98	5	3	.....	2	.....	3	3.0
9 months or more.....	19	18	3	.....	.....	3	.....	1	.....
Not reported.....	5	5	.....	.....	.....	.....	.....	.....	.....
Not gainfully employed.....	541	530	56	18	7	31	105.7	11	2.0

TABLE 28.—*Live births during selected year, infant deaths, and infant mortality rate, according to occupation of mother during year following infant's birth.*

Occupation of mother during year following infant's birth.	Live births.	Infant deaths.	Infant mortality rate. ^a
All mothers.....	2,253	193	85.7
Not gainfully employed.....	1,657	120	72.4
Gainfully employed.....	596	73	122.5
At home.....	538	52	96.7
Keeping lodgers.....	473	45	95.1
Other home work.....	65	7	.....
Away from home.....	58	21	.....
Laundry operatives.....	1	1	.....
Servants.....	6	1	.....
Others in domestic and personal service.....	19	8	.....
Factory operatives.....	18	9	.....
Rubber.....	15	8	.....
Other factory or not specified.....	3	1	.....
Clerks and saleswomen.....	5	1	.....
Teachers.....	2	.....	.....
Other occupations.....	7	1	.....

^aNot shown where base is less than 100.

TABLE 29.—*Births during selected year and infant deaths, according to whether mother was gainfully employed, and age of infant at time when the mother resumed work.*

Employment of mother and age of infant at mother's resumption of work.	Live births.	Infant deaths.
All mothers.....	2,353	158
No gainful work.....	1,177	139
Gainful work.....	586	23
Resumed after infant's death.....	52	3
Resumed during infant's life.....	534	30
No report of time of resumption.....	59	2
Gainful work in home.....	59	2
Resumed after infant's death.....	2	1
Resumed during infant's life.....	57	1
No report of time of resumption.....	1	0
Gainful work out of home.....	527	21
Resumed after infant's death.....	1	0
Resumed during infant's life.....	526	21
No report of time of resumption.....	1	0
Infant's age at time of resumption—		
Under 1 month.....	2	0
2 months, under 3.....	6	0
3 months, under 4.....	2	0
4 months, under 5.....	3	0
5 months, under 6.....	1	0
6 months or older.....	22	0
Not reported.....	1	0

TABLE 30.—*Number and per cent distribution of births during selected year to gainfully employed mothers of specified nativity, according to earnings of mother during year following birth of infant.*

Earnings of mother during year following infant's birth.	Births to gainfully employed mothers.					
	Total mothers.		Native mothers.		Foreign-born mothers.	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
All cases.....	614	100.0	273	100.0	339	100.0
Under \$150.....	269	43.7	141	51.3	148	43.7
\$150 to \$249.....	134	21.8	60	21.8	74	21.8
\$250 to \$349.....	76	12.4	31	11.3	45	13.3
\$350 to \$449.....	50	8.1	13	4.7	37	10.9
\$450 and over.....	38	6.2	17	6.2	21	6.2
No earnings.....	1	0.2	0	0.0	1	0.3
Not reported.....	28	4.2	13	4.7	13	3.8

TABLE 31.—Births during selected year to mothers of specified nationality, according to dominant gainful occupation of mother during her lifetime.

Dominant gainful occupation during mother's lifetime.	Births during selected year.												
	Births to native mothers—					Births to foreign-born mothers.							
	Total births.	Total.	Of native parent- age.	With one or both parents foreign born.	Of par- entage not specified.	Total.	German.	Slavic.	Italian.	Magyar.	English, Irish, Scotch, Welsh.	Jewish.	All other.
All mothers.....	2,322	1,402	973	423	6	920	226	192	152	109	76	61	104
Never gainfully employed.....	294	184	142	40	2	110	15	9	36	5	8	19	18
Gainfully employed less than 1 year.....	199	123	99	24	.....	76	23	19	9	14	1	4	6
Gainfully employed 1 year or more.....	1,823	1,091	730	388	3	732	187	163	107	90	67	38	80
At home.....	300	108	83	25	.....	192	15	39	89	20	3	9	17
Lodgers.....	259	82	64	18	.....	177	12	39	86	17	1	6	16
Other home work.....	41	26	19	7	.....	15	3	.....	.....	3	2	2	1
A way from home.....	1,523	983	647	333	3	540	172	124	18	70	64	29	63
Factory.....	505	265	190	74	1	240	86	60	1	1	32	28	33
Domestic service.....	523	375	207	166	2	148	64	18	6	11	21	15	13
Clerks and saleswomen.....	239	214	155	69	.....	25	7	.....	.....	1	7	6	2
Professionals.....	74	69	56	13	.....	5	.....	.....	.....	1	2	.....	1
Farm work.....	74	.....	.....	.....	.....	74	12	32	5	18	.....	.....	7
Other.....	108	60	39	21	.....	48	3	13	4	7	6	8	.....
Gainfully employed, time not specified.....	6	4	2	1	1	2	1	1	.....	.....	.....	.....	.....
At home.....	4	3	2	1	.....	1	1	.....	.....	.....	.....	.....	.....
Lodgers.....	4	3	2	1	.....	1	1	.....	.....	.....	.....	.....	.....
A way from home.....	2	1	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....
Domestic.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clerks and saleswomen.....	1	1	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....

TABLE 32.—*Births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to number of dwellings in building.*

Dwellings to a building.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All buildings.....	2,322	2,253	193	85.7	69	3.0
Buildings with specified number of dwellings:						
1.....	1,482	1,438	102	70.9	44	3.0
2.....	608	587	62	105.6	21	3.5
3.....	106	106	12	113.2		
4.....	81	78	13		3	
5.....	14	13			1	
6.....	5	5	1			
7.....	6	6	1			
8.....	5	5				
9.....	1	1				
10.....	1	1				
11.....	4	4				
12.....	3	3	1			
13.....	4	4				
22.....	2	2	1			
Not reported.....						

^a Not shown where base is less than 100.TABLE 33.—*Births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to tenure and rental of home and nativity of mother.*

Tenure and rental of home and nativity of mothers.	Total births.	Live births.	Infant deaths.	Infant mortality rate. ^a	Stillbirths.	
					Number.	Per cent of total births. ^a
All mothers.....	2,322	2,253	193	85.7	69	3.0
Home owned.....	920	893	65	72.8	27	2.9
By infant's family.....	812	790	57	72.2	22	2.7
By other family in household.....	108	103	8	77.7	5	4.6
Home not owned.....	1,398	1,356	127	93.7	42	3.0
Monthly rental—						
Under \$5.....	10	10				
\$5 but less than \$10.....	245	238	32	134.5	7	2.9
\$10 but less than \$15.....	440	421	36	85.5	19	4.3
\$15 but less than \$20.....	367	361	32	88.6	6	1.6
\$20 but less than \$25.....	149	145	9	62.1	4	2.7
\$25 but less than \$35.....	88	87	8		1	
\$35 but less than \$50.....	29	28	1		1	
\$50 or more.....	7	6			1	
Free.....	13	13	3			
Not reported.....	50	47	6		3	
Boarding.....	3	3	1			
Not reported.....	1	1				
Native mothers.....	1,402	1,356	95	70.1	46	3.3
Home owned.....	542	525	27	51.4	17	3.1
By infant's family.....	462	448	21	46.9	14	3.0
By other family in household.....	80	77	6		3	
Home not owned.....	856	829	68	82.0	29	3.4
Monthly rental—						
Under \$5.....	2	2				
\$5 but less than \$10.....	70	65	6		5	
\$10 but less than \$15.....	267	255	20	78.4	12	4.5
\$15 but less than \$20.....	256	252	22	87.3	4	1.6
\$20 but less than \$25.....	113	111	5	45.0	2	1.8
\$25 but less than \$35.....	70	69	7		1	
\$35 but less than \$50.....	25	24	1		1	
\$50 or more.....	7	6			1	
Free.....	8	8	3			
Not reported.....	40	37	4		3	
Boarding.....	2	2				

^a Not shown where base is less than 100.

TABLE 33.—*Births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to tenure and rental of home and nativity of mother—Continued.*

Tenure and rental of home and nativity of mothers.	Total births.	Live births.	Infant deaths.	Infant mortality rate.	Stillbirths.	
					Number	Per cent of total births.
Foreign-born mothers.....	920	897	98	109.3	23	2.5
Home owned.....	378	368	38	103.3	10	2.6
By infant's family.....	350	342	31	105.3	8	2.3
By other family in household.....	28	26	2		2	
Home not owned.....	540	527	59	112.0	13	2.4
Monthly rental—						
Under \$5.....	8	8				
\$5 but less than \$10.....	175	173	26	150.3	2	1.1
\$10 but less than \$15.....	173	166	16	96.4	7	4.0
\$15 but less than \$20.....	111	109	10	91.7	2	1.8
\$20 but less than \$25.....	36	34	4		2	
\$25 but less than \$35.....	18	18	1			
\$35 but less than \$50.....	4	4				
Free.....	5	5				
Not reported.....	10	10	2			
Boarding.....	1	1	1			
Not reported.....	1	1				

TABLE 34.—*Infants born during selected year in families living in dwellings having specified number of rooms, according to persons to dwelling and nativity of mother.*

Persons to dwelling and nativity of mother.s	Total births.	Number of rooms in dwelling of residence.																	Not re- ported.
		1	2	3	4	5	6	7	8	9	10	11	12	15	17	21			
All mothers...	2,322	15	166	313	310	477	509	274	162	50	25	8	6	1	1	1	4		
Persons to dwelling:																			
2.....	577	10	80	110	106	130	91	33	12	3		2							
3.....	526	5	48	87	70	112	120	55	21	4	3						1		
4.....	388		20	36	36	80	101	60	39	14		1	1						
5.....	256		8	35	26	50	61	38	25	6	7								
6.....	170		6	17	19	27	37	34	16	7	5				1		1		
7.....	143		4	14	17	31	36	11	16	7	2	1	2		1		1		
8.....	80			8	11	14	19	13	9	3	1	2							
9.....	60			4	15	6	10	9	10	4	1	1							
10.....	49				1	7	15	7	4	1	5								
11.....	28			2	4	5	6	3	6	1		1							
12.....	14				1	3	4	3	1		1		1						
13.....	6					2	2	1					1						
14.....	7				2	1	1	2					1						
15.....	4					2	1	1						1					
16.....	4					2	2												
17.....	3				1	1	1												
18.....	5				1	2	1		1										
19.....	2					1	1												
20.....	3							3											
21.....	1								1										
22.....	1							1											
24.....	2					1			1										
27.....	1															1			
Not reported.....	1																1		
Native mothers.....	1,402	4	54	127	158	287	354	213	132	38	22	7	2	1	1	1	1		
Persons to dwelling:																			
2.....	411	4	26	72	79	109	76	28	12	3		2							
3.....	357		19	37	43	83	99	51	18	4	3								
4.....	249		4	7	14	51	77	53	31	10		1	1						
5.....	147		3	3	10	22	40	31	25	6	7								
6.....	90			2	3	12	24	22	15	6	4				1		1		
7.....	61		2	1	5	4	23	7	11	4	2	1			1				
8.....	31			3	2	1	7	6	7	2	1	2							
9.....	27			2	2	3	5	6	6	1	1	1							
10.....	16						3	5	3	1	4								
11.....	9					2		2	4	1									
12.....	1							1											
14.....	2							1					1						
27.....	1															1			

TABLE 34.—*Infants born during selected year in families living in dwellings having specified number of rooms, according to persons to dwelling and nativity of mother—Continued.*

Persons to dwelling and nativity of mother. ^a	Total births	Number of rooms in dwelling of residence.																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	17	21	Not re- ported.		
Foreign-born mothers.....	920	11	112	186	152	190	155	61	30	12	3	1	4					3	
Persons to dwelling:																			
2.....	166	6	54	38	27	21	15	5											
3.....	169	5	29	50	27	29	21	4	3									1	
4.....	139		16	29	22	29	24	7	8	4									
5.....	109		5	32	16	28	21	7											
6.....	80		6	15	16	15	13	12	1	1	1								
7.....	82		2	13	12	27	13	4	5	3			2					1	
8.....	49			5	9	13	12	7	2	1									
9.....	33			2	13	3	5	3	4	3									
10.....	24				1	7	12	2	1		1								
11.....	19			2	4	3	6	1	2			1							
12.....	13				1	3	4	2	1		1		1						
13.....	6					2	2	1					1						
14.....	5				2	1	1	1											
15.....	4					2	1	1											
16.....	4					2	2												
17.....	3					1	1	1											
18.....	5				1	1	1												
19.....	2				1	1	1												
20.....	3																		
21.....	1							3											
22.....	1							1	1										
24.....	2					1				1									
Not reported.....	1																	1	

^a Infant not included in number.TABLE 35.—*Births during selected year to mothers of specified nationality, according to number of lodgers in household.*

Number of lodgers.	Total births.	Births to native mothers.	Births to foreign-born mothers.						
			Total.	German.	Italian.	Slavic.		Magyar.	Other foreign-born.
						Serbo-Croatian and Slovak.	Other.		
All mothers.....	2,322	1,402	920	226	152	147	45	109	241
Lodgers.....	398	155	243	31	83	47	14	28	40
1 lodger.....	163	97	66	17	10	5	3	7	24
2 lodgers.....	76	33	43	6	19	5	7	2	4
3 lodgers.....	35	7	28	2	19	2	1	3	1
4 lodgers.....	37	7	30	2	17	4	1	3	3
5 lodgers.....	9	2	7	1	4	2			
6 lodgers.....	17	6	11		4	5	1	1	
7 lodgers.....	12	2	10		2	5		1	2
8 lodgers.....	15		15	1	6	4		4	
9 lodgers.....	5		5	1	1	3			
10 lodgers.....	6		6		1	1		2	2
11 lodgers or more.....	23	1	22	1		11	1	5	4
No lodgers.....	1,924	1,247	677	195	69	100	31	81	201

TABLE 32.—Births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to number of dwellings on building.

Description of building	Total births	Live births	Infant deaths	Infant mortality rate,*	Stillbirths	
					Number	Per cent of total births
All mothers	2,332	2,253	193	85.7	68	3.0
Dwellings with specified number of dwell- ings						
1	1,421	1,402	171	122.0	21	1.5
2	1,212	1,176	111	94.4	11	0.9
3	1,111	1,077	111	102.2	11	1.0
4	1,011	977	111	113.6	11	1.1
5	911	877	111	123.2	11	1.2
6	811	777	111	141.7	11	1.4
7	711	677	111	161.7	11	1.6
8	611	577	111	191.7	11	1.8
9	511	477	111	231.7	11	2.2
10	411	377	111	291.7	11	2.7
11	311	277	111	361.7	11	3.5
12	211	177	111	451.7	11	5.2
13	111	77	111	141.7	11	10.0
14	111	77	111	141.7	11	10.0
15	111	77	111	141.7	11	10.0
16	111	77	111	141.7	11	10.0
17	111	77	111	141.7	11	10.0
18	111	77	111	141.7	11	10.0
19	111	77	111	141.7	11	10.0
20	111	77	111	141.7	11	10.0
21	111	77	111	141.7	11	10.0
22	111	77	111	141.7	11	10.0
Not reported	1	1	1	100.0	1	1.0

* Not shown where base is less than 100.

TABLE 33.—Births during selected year, live births, infant deaths, infant mortality rate, and per cent of stillbirths, according to tenure and rental of home and nativity of mother.

Tenure and rental of home and nativity of mothers	Total births	Live births	Infant deaths	Infant mortality rate,*	Stillbirths	
					Number	Per cent of total births
All mothers	2,332	2,253	193	85.7	68	3.0
Home owned	1,090	1,063	65	61.2	37	3.4
By infant's family	612	599	37	61.2	22	3.6
By other family in household	108	103	8	7.7	5	4.6
Home not owned	1,396	1,356	127	92.7	42	3.0
Monthly rental—						
Under \$5.	10	10	—	—	—	—
\$5 but less than \$10.	245	239	32	134.3	7	2.9
\$10 but less than \$15.	443	421	36	85.5	19	4.3
\$15 but less than \$20.	367	361	32	88.6	6	1.6
\$20 but less than \$25.	149	145	9	62.1	4	2.7
\$25 but less than \$35.	88	87	8	92.0	1	1.1
\$35 but less than \$50.	29	28	1	3.4	1	3.4
\$50 or more.	7	6	—	—	1	14.3
Free.	13	13	3	23.1	—	—
Not reported.	50	47	6	12.8	3	6.4
Boarding.	3	3	1	33.3	—	—
Not reported.	1	1	—	—	—	—
Native mothers	1,402	1,356	95	70.1	46	3.3
Home owned	542	525	37	68.4	17	3.1
By infant's family	462	448	21	45.9	14	3.0
By other family in household	80	77	6	7.5	3	3.8
Home not owned	856	830	68	82.0	29	3.4
Monthly rental—						
Under \$5.	2	2	—	—	—	—
\$5 but less than \$10.	70	65	6	9.1	5	7.7
\$10 but less than \$15.	267	253	20	78.4	12	4.5
\$15 but less than \$20.	256	252	22	87.3	4	1.6
\$20 but less than \$25.	113	111	5	45.0	2	1.8
\$25 but less than \$35.	70	69	7	10.1	1	1.4
\$35 but less than \$50.	25	24	1	4.2	1	4.0
\$50 or more.	7	6	—	—	1	14.3
Free.	8	8	3	37.5	—	—
Not reported.	40	37	4	10.8	3	8.1
Boarding.	2	2	—	—	—	—

* Not shown where base is less than 100.

TABLE 38.—*Mothers reporting specified number of miscarriages, stillbirths, and infant deaths, according to number of pregnancies to mother, and nativity of mother.*

Pregnancies to mother and nativity of mother.	Total mothers.	Mothers reporting specified number of miscarriages, stillbirths, and infant deaths.								
		None.	1	2	3	4	5	6	7	8
All mothers.....	2,287	1,507	532	151	50	23	15	6	2	1
Pregnancies:										
1.....	789	700	88	1						
2.....	538	399	115	23	1					
3.....	332	194	109	26	3					
4.....	216	107	78	29		1	1			
5.....	147	56	53	22	11	5				
6.....	93	25	35	19	9	2	3			
7.....	64	12	25	12	6	6	3			
8.....	38	5	13	5	9	5		1		
9.....	31	6	9	8	5	1	1	1		
10.....	13	2	3	1	4	2			1	
11.....	7		2	3		1		1		
12.....	10	1	1	2	1		4			1
13.....	5						2	3		
15.....	3		1		1				1	
17.....	1						1			
Native mothers.....	1,384	1,005	272	66	24	8	6	2	1	
Pregnancies:										
1.....	568	500	65	1						
2.....	347	289	61	13	1					
3.....	185	126	44	14	1					
4.....	108	57	37	12		1	1			
5.....	68	27	25	8	6	2				
6.....	40	12	15	9	2	1	1			
7.....	26	6	9	3	4	3	1			
8.....	16	2	6	2	4	1		1		
9.....	14	4	5	1	3			1		
10.....	3	1			2					
11.....	4		2	2						
12.....	4	1		1			2			
15.....	2				1				1	
17.....	1						1			
Foreign-born mothers.....	903	502	260	85	26	15	9	4	1	1
Pregnancies:										
1.....	223	200	23							
2.....	191	130	51	10						
3.....	147	68	65	12	2					
4.....	108	50	41	17						
5.....	79	29	28	14	5	3				
6.....	53	13	20	10	7	1	2			
7.....	38	6	16	9	2	3	2			
8.....	22	3	7	3	5	4				
9.....	17	2	4	7	2	1	1			
10.....	10	1	3	1	2	2			1	
11.....	3		1	1		1		1		
12.....	6		1	1	1		2			1
13.....	5						2	3		
15.....	1		1							

TABLE 39.—*Mothers reporting specified number of infant deaths, according to number of live births to mother, and nativity of mother.*

Live births to mother, and nativity of mother.	Total mothers.	Mothers reporting specified number of infant deaths.							
		None.	1	2	3	4	5	6	7
All mothers.....	2,252	1,704	422	95	21	12	6	1	1
Live births:									
1.....	813	745	68						
2.....	537	443	99	5					
3.....	333	237	94	9	3				
4.....	205	127	61	15	2				
5.....	150	77	50	19	2	1	1		
6.....	67	33	20	11	2		1		
7.....	56	21	20	10	2	3			
8.....	36	11	12	6	4	3			
9.....	22	7	5	4	3	2	1		
10.....	19	2	7	4	3	2			1
11.....	6		4	1		1			
12.....	2	1	1						
13.....	3						2	1	
14.....	1			1					
15.....	1		1						
17.....	1						1		
Native mothers.....	1,357	1,130	181	34	7	1	4		
Live births:									
1.....	579	532	47						
2.....	343	298	42	3					
3.....	185	154	26	3	2				
4.....	99	70	23	5	1				
5.....	65	37	20	6	1		1		
6.....	30	16	8	5			1		
7.....	22	12	5	5					
8.....	10	4	3	2	1				
9.....	11	5	2	1		1			
10.....	6	1	2	3					
11.....	3		3						
12.....	1	1						1	
13.....	1								
14.....	1			1					
17.....	1						1		
Foreign-born mothers.....	95	574	241	51	14	11	2	1	1
Live births:									
1.....	234	213	21						
2.....	191	145	17	2					
3.....	148	83	58	6	1				
4.....	106	57	38	10	1				
5.....	85	40	30	13	1	1			
6.....	37	17	12	6	2				
7.....	34	9	15	5		3			
8.....	26	7	9	4	3	3			
9.....	11	2	3	3	1	1	1		
10.....	13	1	5	1	3	2			1
11.....	3		1	1		1			
12.....	1		1						
13.....	2						1	1	
15.....	1		1						

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